

**EGLIN AIR FORCE BASE
Florida**

**AIR FORCE MATERIEL COMMAND
READINESS TRAINING CENTER**

**FINAL ENVIRONMENTAL
ASSESSMENT**



May 2003

Report Documentation Page

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FINDING OF NO SIGNIFICANT IMPACT
for
AFMC Readiness Training Center
RCS 00-396, 02-209, 02-245

Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (40 Code of Federal Regulations 1500-1508), 32 Code of Federal Regulations 989 (Environmental Impact Analysis Process), and Department of Defense Directive 6050.1, the Department of the Air Force has conducted an Environmental Assessment (EA) of the probable environmental consequences for establishment of an Air Force Materiel Command Readiness Training Center at Eglin Air Force Base.

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

Proposed Action:

The Proposed Action, which is also the Preferred Alternative, is to establish a Readiness Training Center at Eglin AFB with garrison support facilities and natural terrain training areas. The permanent beddown location for the RTC Squadron would be in an area south of Test Area D-51 (herein referred to as D-51 South). Existing support facilities at Base Tango on Eglin Main and LZ East, located in the northeast quadrant of the reservation, would be used on an interim basis until permanent facilities at D-51 South are complete. Garrison and "military operation over urban terrain" (MOUT) facilities at D-51 South would be constructed south of Highway 20 under the proposed action.

Alternative Action:

The Action Alternative is exactly the same as the proposed action in all respects with the exception of constructing the garrison and MOUT facility **north** of Highway 20, which is a less expensive option than the Proposed Action due to the existence of water, power, and communication utilities at that site. Utilities for the garrison and MOUT are not currently present at the Proposed Action site, south of Highway 20.

No Action Alternative:

Under the no action alternative an AFMC RTC would not be established at Eglin AFB. AFMC would continue to depend on Air Combat Command (ACC) and Air Mobility Command (AMC) to provide SF protection and ground combat training.

SUMMARY OF THE ANTICIPATED ENVIRONMENTAL EFFECTS

Water Quality/Wetlands

The LZ East Training area and the D-51 South Training area encompass some wetland areas. Foot traffic would potentially enter these areas during the course of training but, by nature, these activities are minimally impactive. Vehicle traffic would avoid wetlands unless obtaining special authorization to enter. A Section 404 Permit would not be required. The action requires construction of areas greater than five acres in size; therefore a NPDES stormwater permit is required. Facility construction would not occur within a wetland or floodplain area. Repair and culvert installation of an existing road that currently routes traffic through a wetland would be required, but the overall impacts would be positive.

Air Quality

Air emissions from training expenditures, namely smoke, small arms blank ammunition, and blast simulators would not exceed state or federal air quality standards.

Restricted Access

The proposed action would permanently close approximately 3,500 acres of land presently used for hunting and outdoor recreation by the public.

Cultural Resources

Archaeological surveys of the LZ East and D-51 south RTC locations are underway but not yet completed. Archaeological sites determined to be eligible for listing in the National Register of Historic Places are present at both locations. These resources must be avoided during construction and training activities. Coordination with AAC/EMH will be necessary to avoid possible destruction of these resources. Consultation with the SHPO is required and must be completed before the project begins. This consultation cannot take place until all surveys are complete.

Noise

Small arms would produce noise perceptible to residential areas. However, noise thresholds for public annoyance would not be exceeded.

Safety

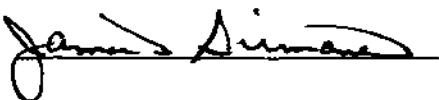
There are no safety concerns associated with the proposed action and the public. Observance of safe handling procedures of blast simulators and blank munitions would preclude any potential noise or injury concerns to trainees or instructors.

Biological Resources

The proposed action would potentially affect sensitive plant species. Locations of some of these species have been input on Eglin GIS files; thus these species can be avoided. Protected animal species such as the indigo snake and the gopher tortoise (whose burrows are home to state and federal listed species) potentially occur within the LZ East and D-51 South RTC areas and may be affected. An endangered species consultation would be required for potential impacts to the indigo snake, based on its association with gopher tortoise burrows that may be affected. The areas should be surveyed for gopher tortoise burrows prior to commencement of exercises or construction.

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

After a review of the EA by the Air Armament Center, Environmental Impact Analysis Process Committee, it has been concluded that the proposed action and the no-action alternative would not have a significant adverse impact on the quality of the human or natural environment. Therefore, an Environmental Impact Statement is not required for these options. This analysis fulfills the requirements of the National Environmental Policy Act, the President's Council on Environmental Quality, and 32 CFR Part 989.



23 May 2003
DATE

AIR FORCE MATERIEL COMMAND READINESS TRAINING CENTER

FINAL ENVIRONMENTAL ASSESSMENT

Prepared for:

**DEPARTMENT OF THE AIR FORCE
Eglin Air Force Base, Florida**

RCS 00-396, 02-209, 02-245

May 2003



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LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS

96 AMDS/SGPB	Bioenvironmental Engineering Flight
96 CEG/CECP	Civil Engineering Base Development Flight
96 CEG/CERX	Civil Engineering Resource Division Planning Branch
AAC	Air Armament Center
AAC/EMCE	Air Armament Center, Environmental Engineering
AAC/EMH	Air Armament Center, Cultural Resources
AAC/EMSN	Air Armament Center, Natural Resources
AAC/EMSP	Air Armament Center, Environmental Analysis
ACC	Air Combat Command
AFB	Air Force Base
AFI	Air Force Instruction
AFMC	Air Force Materiel Command
AFOSH	Air Force Occupational Safety and Health
AFSC	Air Force Security Contingency
AGL	Above Ground Level
AMC	Air Mobility Command
AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirements
ATV	All-Terrain Vehicle
BMPs	Best Management Practices
BT	Base Tango
BX	Base Exchange
CAA	Clean Air Act
CATEX	Categorical Exclusion
CDNL	Day-Night Average of C-Weighted Noise
CEC	Cation Exchange Capacity
CEQ	Council on Environmental Quality
CO	Carbon Monoxide
CWA	Clean Water Act
CZMP	Coastal Zone Management Program
dB	Decibel
dbh	Diameter at Breast Height
DCA	Department of Community Affairs
DPI	Direct Physical Impacts
EA	Environmental Assessment
ECP	Entry Control Point
EFC	Expeditionary Field Camp
EIAP	Environmental Impact Analysis Process
EO	Executive Order
EOD	Explosive Ordnance Disposal
EP	Exotic Plants
EPA	U.S. Environmental Protection Agency
FCMP	Florida Coastal Management Program
FDEP	Florida Department of Environmental Protection
FFWCC	Florida Fish and Wildlife Conservation Commission
FNAI	Florida Natural Areas Inventory
FONSI	Finding of No Significant Impact
FPTF	Force Protection Training Flight
GCL	Gulf Coastal Lowlands
GIS	Geographic Information Systems
HMMWV	High Mobility Multi-Wheeled Vehicle
IRP	Installation Restoration Program
L_{Cdn}	C-weighted Day-Night Average Sound Level
LPS	Longleaf Pine Sandhills
LUC	Land Use Controls

LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS CONT'D

LZ	Landing Zone
µg/m³	Micrograms per Cubic Meter
mg/m³	Milligrams per Cubic Meter
mm	Millimeter
MOUT	Military Operation Over Urban Terrain
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFA	No Further Action
NH	Northern Highlands
NHPA	National Historic Preservation Act
NO₂	Nitrogen Dioxide
NPDES	National Pollution Discharge Elimination System
NPS	Nonpoint Source
O₃	Ozone
OSHA	Occupational Safety and Health Administration
Pb	Lead
PM	Particulate Matter
POI	Point of Interest
PoW	Prisoner of War
ppm	Parts Per Million
RAA	Restricted Access Area
RC3	Range Configuration Control Committee
RDESC	Range Development Executive Steering Committee
RESOMS	Resource Scheduling and Operational Management System
ROCC	Range Operations Control Center
ROI	Region of Influence
RTC	Readiness Training Center
RR	Range Road
SA	Surficial Aquifer
SAIC	Science Applications International Corporation
SF	Security Forces
SHPO	State Historic Preservation Officer
SO₂	Sulfur Dioxide
SPS	Sand Pine Sandhill
SVOC	Semi-volatile Organic Compounds
TA	Test Area
TSP	Total Suspended Particulates
TU	Training Unit
UHF	Upland Hardwood Forest
UMF	Upland Mixed Forest
USAF	United States Air Force
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UTC	Unit Type Codes
UXO	Unexploded Ordnance
VIP	Very Important Person
XH	Xeric Hammock

1. PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 PURPOSE AND NEED FOR THE ACTION

This Environmental Assessment (EA) has been prepared to evaluate potential environmental impacts associated with the establishment and beddown of an Air Force Materiel Command (AFMC) Readiness Training Center (RTC) squadron at Eglin Air Force Base, with temporary facilities at Base Tango (BT) and Landing Zone (LZ) East, and permanent facilities at an area south of Test Area D-51. An AFMC RTC would enable force protection and ground combat training to be conducted at Eglin Air Force Base (AFB) (Figure 1-1).

This action is needed for the following reasons:

1. Recent world events require the consolidation of readiness training capabilities to ensure that employable/deployable personnel are certified in Basic Combat Skills and/or other performance capabilities in support of Expeditionary Combat Support roles. The Air Force (AF) requires that Security Forces (SF) personnel be trained at a facility with natural densely vegetated environments to simulate possible field combat conditions.
2. The AFMC does not currently have a facility for training SF and other unit tasking codes (UTC) in Expeditionary Combat Support including ground combat skills, force protection, and security. Presently, the AFMC depends on Air Combat Command (ACC) and Air Mobility Command (AMC) to provide these types of training.
3. An AFMC RTC would ensure equity in the long-term availability and quality of SF UTC training facilities and manpower during a time of downsizing. Utilization of existing support facilities could drive full utilization with little start up cost.
4. Bringing together existing skilled instructors with state-of-the-art equipment, facilities and curricula would maximize training success and efficiency. Instructors and training support personnel would come from augmented SF flight unit type codes stationed at AFMC bases.
5. An AFMC/RTC could provide Air Force Security Commands and other agencies with combat training support capabilities (i.e., additional source of funds).

Activities associated with the proposed action include the acquisition of personnel support, manpower positions, equipment, facilities, and land training areas. Activities within the scope of this EA include the construction of facilities and use of Eglin land areas for training.

The RTC training cadre would be comprised of SF personnel that provide Air Force base defense/ground combat skills and force protection/security training for all AFMC SF deployable forces in support of AFMC Air Expeditionary Forces and contingencies. The center would be staffed for initial operation capability with SF assets and, once established, the cadre would develop training modules to provide a capability to offer readiness training and all levels of antiterrorism training to any deploying Air Force security contingency (AFSC).

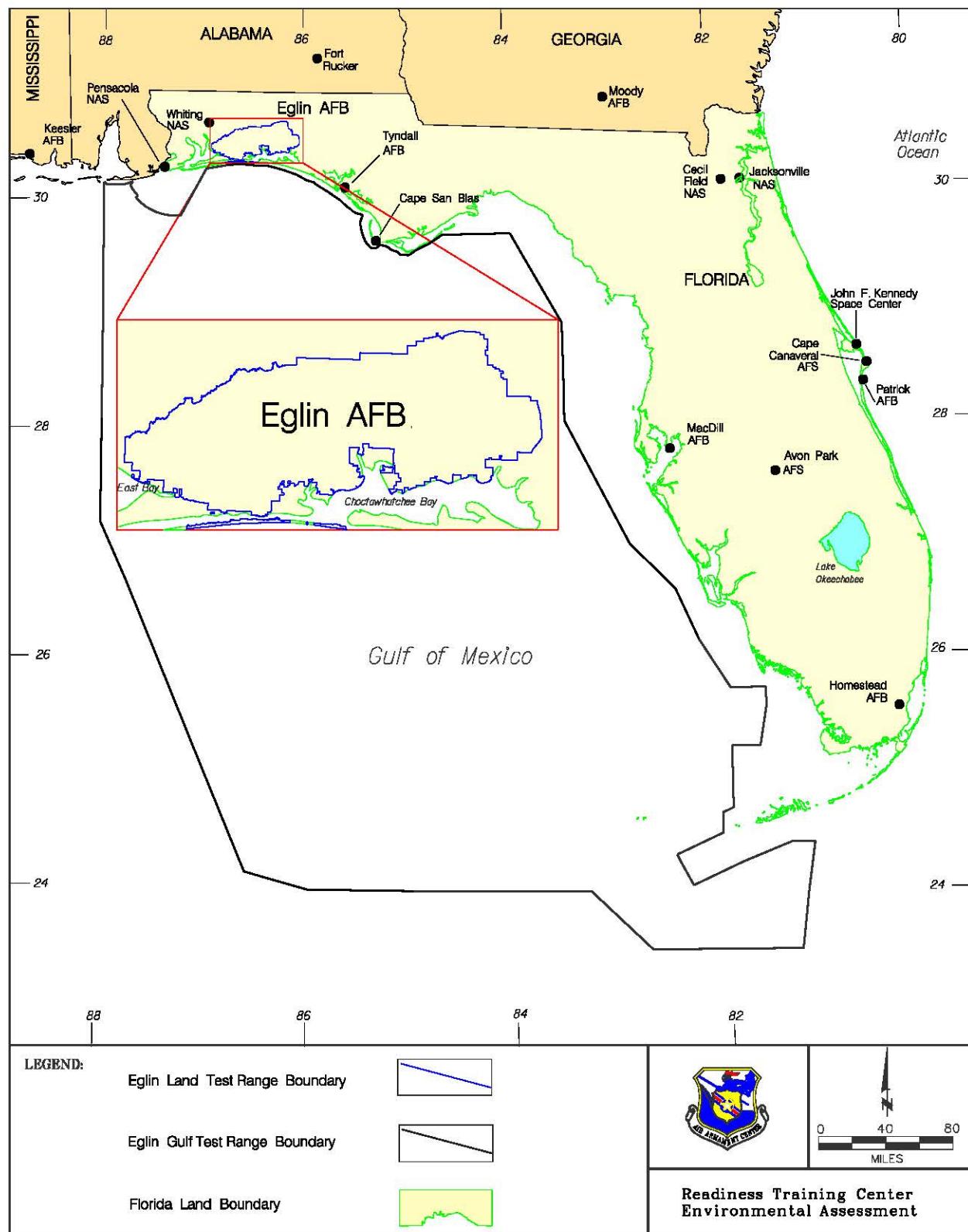


Figure 1-1. The Eglin Military Complex

An Air Force beddown is the provision of expedient facilities for troop support to provide a platform for the projection of force. These facilities may include modular or kit-type facility substitutes. Acquisition of suitable field training areas is subject to 46th Test Wing approval. The Air Armament Center (AAC) will lead a joint AFMC/AAC beddown team for the proposed Eglin RTC. Eglin AFB was chosen as the beddown location for the RTC based on the availability of diverse natural terrain features for training and presence of infrastructure requirements. The RTC target standup date is October 2002.

The mission of the RTC is to prepare SF and other deployable Air Force Security Commands with force protection and ground combat skills training that meets mission-critical/deployment or annual training requirements. The proposed RTC training would focus on aerial port environment and resource protection, entry and circulation control, and ground defense certification in skills demanded by the current operating environment or in single service, joint, or NATO environments.

The implementation of the proposed action would establish infrastructure, facilities, and outdoor training areas for AFMC Force Protection Training Flight and Regional Training Flight Security Forces force protection and ground combat training at Eglin AFB. A Test and Training Space Needs Statement (AFI 13-212) may be needed for the Proposed Action.

Proposed RTC field training activities include those for entry control point, PoW camp security, military operation over urban terrain (MOUT), vehicle escorts, convoy operations, base defense, bivouacking small weapons tactics, foot and vehicle reconnaissance, orientation/land navigation, and patrolling. Training in entry control point, base defense, MOUT, vehicle escorts, convoy operations, bivouacking, and PoW camp security would require the construction of building and/or support features. Training in small arms tactics, foot and vehicle reconnaissance, orientation/land navigation, and patrolling uses natural features of the terrain and would not entail construction.

The PoW camp and MOUT training areas require the construction of buildings and props to instill realism into training scenarios. Access to or construction of a clay surface aircraft landing strip would also be a training requirement. Some existing roads would require upgrading and widening. Road work would be accomplished in compliance with Chapter 404 of the Clean Water Act, Florida Administrative Code 62-312 and with the January 2001 Eglin Air Force Base Road Maintenance Handbook.

Facility requirements include interim facilities, a permanent garrison, and an expeditionary camp for field training. Interim facility requirements include temporary academic classrooms and administrative offices, storage (vehicle, munitions, weapons, and equipment), billeting, and dining facilities within walking distance of academic and administrative areas. This interim need would be met by using existing facilities on Eglin Main. Power and potable water would be required. Onsite wastewater treatment is not planned, but portable latrines would be used at various locations to collect sewage. All sewage and kitchen wastes would be collected and disposed offsite at a treatment facility.

Facility requirements for the permanent garrison training area would include classrooms and offices, dorm/billeting, dining hall, equipment and weapons storage, warehousing, and vehicle

maintenance bay. Facility requirements for the expeditionary field camp would include billeting, hardback tent or modular inclement weather classroom, fuel point, field chow hall, latrines and showers adjacent to the field runway, MOUT area, and austere environment.

Munitions to be expended during proposed action training include small arms blanks, smoke grenades, and blast simulators. Live ammunition expenditures are not a component of the proposed action. Additional expenditure data is presented in Chapter 2.

1.1.1 Preceding Actions

On 24 May 2000, COMAFMC directed an exploratory survey to determine the feasibility of establishing a warfare training center at Eglin AFB. The Eglin 96 SFS/SFM, as representative of HQ AFMC/SF, Wright-Patterson AFB, Ohio, has coordinated with the Eglin Range Configuration Control Committee in identifying training locations and facilities for the AFMC RTC at Eglin AFB.

1.2 ENVIRONMENTAL ISSUES REVIEW

This document was prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations of 1978, and 32 Code of Federal Regulations Part 989. To initiate the environmental analysis, the proponent (96 CEG/CERR) submitted an Air Force (AF) Form 813 – Request for Environmental Impact Analysis – to the Air Armament Center/Environmental Management Directorate, Stewardship Division, Environmental Analysis Branch (AAC/EMSP).

As an analysis component of this EA, preliminary screening was employed to determine potential issues regarding the physical, biological, and anthropogenic environment from the activities of the proposed action at the alternative locations. Issues are general categories used to distinguish potential impacts to the environment from the proposed action and alternatives. Potential impacts from the following issues were evaluated:

- **Direct Physical Impacts** - Direct physical interactions between humans and soil, plant, and animal features.
- **Chemical Materials** - Generation of by-products, wastes, and expenditures including chemical materials and noise that would require management, planning, and coordination to ensure elimination, containment, and/or minimization of biological and human environment exposure potentials.
- **Noise** – Unwanted sound with the potential to either disturb or injure persons or animals that may be exposed to it.
- **Habitat Alteration** - Modification to terrain or vegetation that results in impacts to the habitats of federal or state protected species.
- **Land Use Constraints** - Alterations in type, frequency, and/or intensity of current land uses within the realm of influence of the proposed RTC that may result in conflicts with future land use.

- **Restricted Access** - Exclusion or restricted access of the public to proposed RTC land areas for recreation or other uses.
- **Safety** - Hazards to human health from construction or disturbance of unexploded ordnance.

1.2.1 Environmental Justice

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies. The purpose of environmental justice analysis is to identify disproportionately high and adverse socioeconomic and/or environmental impacts and identify appropriate alternatives.

On 11 February 1994, Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) was issued to ensure that the NEPA process considers environmental concerns of minority and low-income communities that may be impacted by federal actions.

1.2.2 Issues Considered But Excluded From Further Analysis

The following issues were determined to be either minimal or to have no effect or were nonapplicable to the proposed action alternatives analyzed in this document. Issues excluded from further analysis include socioeconomic resources, environmental health and safety risks to children, and coastal zone management. These issues and exclusion rationale are presented in the following sections.

Socioeconomic Resources

Socioeconomic resources include factors associated with the human environment such as population, employment and earnings, community services, demographics, and recreation. The RTC logistic support of approximately 46 instructors and administrative staff would come from the Eglin AFB 96 SFS/SFM, which limits the requirement for relocation of additional personal from other locations.

Compatible Uses

As Eglin AFB range owner, the Test Wing Commander is responsible for the oversight of mission activities and developments on the Eglin reservation. This responsibility is exercised through the Range Development Executive Steering Committee (RDESC) and its subcommittee the Range Configuration Control Committee (RC3). The RC3 is responsible for overseeing the coordination of Eglin range mission activities and interfaces between proponent organizations and key decision-makers. The RC3 reviews proposed military missions and elevates unresolved

issues or shortfalls to the RDESC. The process ensures that mission related issues are addressed at the highest possible level.

In a review of the proponent's proposal to establish an RTC at Eglin AFB, the RDESC identified no mission compatibility issues for the Base Tango, LZ East, and D-51 locations, with the stipulation that LZ East be used as an interim training location and no hard structures be constructed at the site. The implementation of the proposed action could result in a change in the day-to-day military use of Eglin land areas or conflict with existing or planned mission activities due to overlapping safety footprints. Most importantly, situations where a hot air or ground mission footprint encompassed the RTC area, RTC personnel and trainees would be required to evacuate.

Environmental Health and Safety Risks to Children

Executive Order 13045 (Environmental Health and Safety Risks to Children) requires federal agencies to identify disproportionately high and adverse human health or environmental effects on children. Based on a preliminary screening of alternatives, it was determined that the region of influence (ROI) of the proposed action would not result in health or safety risks to children.

Coastal Zone Management

The federal Coastal Zone Management Program (CZMP) was established by the Coastal Zone Management Act of 1972, as amended through P.L. 104-150, to declare a national policy to preserve, protect, develop, and where possible, restore or enhance the resources of the nation's coastal zone and to encourage and assist states in developing coastal zone management programs. The program is administered by the Coastal Programs Division of the National Oceanic and Atmospheric Administrations Office of Ocean and Coastal Resource Management.

The Florida Coastal Management Program (FCMP) was established in 1981 to coordinate local, state, and federal agency activities using existing laws to ensure that Florida's coast is as valuable to future generations as it is today. Florida's Department of Community Affairs (DCA) has been responsible for directing the implementation of the statewide FCMP since 1992. FCMP operates under the auspices of 23 Florida statutes administered by 11 state agencies and four of five water management districts. The FCMP was established to:

- Promote the wise use and protection of the state's water, cultural, historic, and biological resources
- Protect the state's transportation system
- Minimize the state's vulnerability to coastal hazards
- Protect the state's property interest as owners of sovereign submerged lands
- Ensure compliance with the state's growth management laws (FCMP, 2000)

Some areas of Eglin AFB are located within the FCMP coastal zone management area as are the southernmost areas of the proposed action. Issues typically evaluated for FCMP compliance such as septic tank placement, nonpoint source pollution, construction within flood zones and

consistency with community coastal development plans (FDEP, 2002), are not issues with the proposed action. The proposed action would not involve construction within the flood zone or septic tank installation. Surface runoff for construction or clearing activities greater than five acres would be addressed through a nonpoint source permit. Community development plans would not be affected by the proposed action, which would take place on federal property.

Natural Resource Management

Establishing the RTC at Eglin AFB could affect natural resource management activities such as timber harvesting, prescribed burns, ecosystem restoration, fire management, and other activities conducted by the Eglin AFB Natural Resources Branch, Jackson Guard. The desired physical condition of natural area vegetation preferred for RTC training areas may conflict with Eglin AFB natural resource management objectives. However, based on conversations with Jackson Guard, no conflicts between RTC training activities and natural resource management were identified.

1.3 PERMIT REQUIREMENTS

Permits are issued to ensure compliance with state and federal statutes. The proposed construction activities would require a National Pollution Discharge Elimination System (NPDES) permit for stormwater, and annual fuel use and munitions expenditures are to be reported to AAC/EMCE.

No permits would be necessary for potable water use; potable water would be trucked to the site and stored.

No permits would be necessary for wastewater. Portable latrines would be used to collect sewage waste, which would then be transported for proper disposal to on-base or off-base waste water treatment plants. Kitchen wastes would also be collected and disposed of in the same manner. Field shower and other similar graywater wastes would not require a permit.

1.3.1 Air Emissions

The Title V Air Operation permit currently held by Eglin AFB regulates the stationary air emission sources on the Eglin reservation. The Title V permit lists a group of emissions units/activities that are defined as unregulated sources. These units emit no “emissions-limited pollutant” and are not subject to any specific work practice standard. However, they are subject to regulations applied on a facility-wide basis (visible emissions, odor, unconfined emissions) and to regulations that require only that they be able to prove exemption from otherwise applicable unit-specific emissions or work practice standards. The proposed RTC training activities associated with the munitions expenditures are considered an unregulated emission source eliminating additional permitting requirements. The RTC, 96 SFS/SFM, would be required to report to Air Armament Center Environmental Engineering (AAC/EMCE) the types and amount of activities and energetic materials consumed during training activities. The data are included in the Eglin annual air emission report annually submitted to the Florida Department of Environmental Protection (FDEP).

1.3.2 Stormwater

The impervious areas created by the proposed bivouac pads, road, building, and parking area construction would require a NPDES Permit because the total area of disturbance is greater than five acres. The area of disturbance criteria under NPDES regulation changes from five acres to one acre in March 2003. Construction on the Eglin reservation must comply with the Eglin Modified Multi-Sector General NPDES stormwater permit (issued by the FDEP) and Chapter 62-25, Florida Administrative Code.

A notice of intent must be filed with the FDEP to acquire the NPDES permit. In addition, stormwater management Best Management Practices (BMPs) may require implementation at the proposed construction sites to minimize on- and off-site pollution potentials.

2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action, which is also the Preferred Alternative, is to establish a Readiness Training Center at Eglin AFB with classroom facilities and natural terrain areas. The permanent beddown location for the RTC Squadron would be in an area south of Test Area D-51 (herein referred to as D-51 South). Existing support facilities at Base Tango on Eglin Main and LZ East, located in the northeast quadrant of the reservation, would be used on an interim basis until permanent facilities at D-51 South are complete. Garrison and MOUT facilities at D-51 South would be constructed *south* of Highway 20 under the proposed action.

Under the proposed action and during the transition from temporary to permanent training capabilities, Base Tango would be used for a period of six months, and Base Tango and LZ East would be used in conjunction for a period of six months to five years. Finally, D-51 South (with the preferred siting of the Garrison and MOUT facilities) would be used after five years.

Beddown of an RTC Squadron at Eglin would include the construction of support facilities and infrastructure, modification/upgrading of unpaved road transportation systems, and construction of training props and building mock-ups to maximize realism in training scenarios. The permanent (D-51 South) and interim (Base Tango on Eglin Main, LZ East) locations for implementing the proposed action are presented in Figure 2-1. More detailed views of these locations are provided in Figures 2-2 through 2-4.

Training would be accomplished using a modular approach. Instruction training modules are created to meet specific training requirements and combined to form course curricula. Modules are added, deleted, and modified as needed without altering an entire curriculum. Typically a core combat skills training curriculum is modified to fulfill mission-specific training needs. For example, trainees enroute to a NATO peacekeeping mission would have the same core training but use different modules from trainees enroute to a humanitarian relief mission. The following sections discuss the locations, throughput capabilities and schedule, field training activities, and construction requirements associated with the proposed action.

2.1.1 Location Descriptions of the Proposed Action

D-51 South

D-51 South is the permanent (five plus years) location for the beddown of the Readiness Training Squadron, 96 SFS/SFM, at Eglin AFB (Figure 2-2). The proposed beddown area would include garrison and expeditionary camp locations and provide natural areas for the proposed action training activities. The field training area would cover approximately 740 acres. The RTC D-51 South site would include Eglin reservation lands south of RR 218 from RR 214 west to the reservation boundary that intersect with Bluewater Bay and southwest of Highway 20 to the Lake Pippin area. There are 55 miles of roads at D-51 South.

The garrison and MOUT facilities would be located south of Highway 20. The proposed location of the assembly area, mock airstrip, entry control point training area, MOUT village, and PoW camp are shown in Figure 2-2. Bivouacs would occur within the training area.

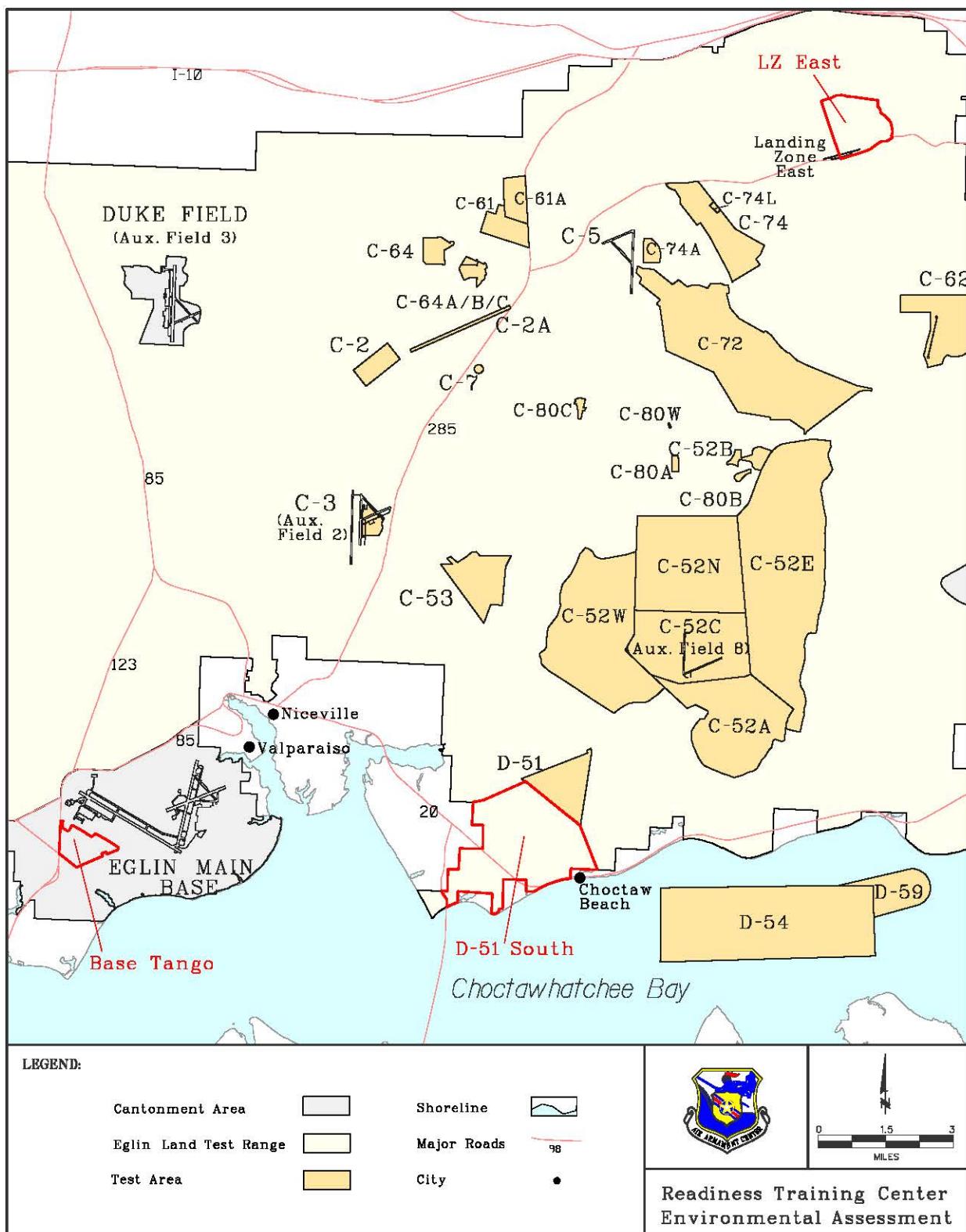


Figure 2-1. Proposed RTC Locations Base Tango, LZ East, and D-51 South

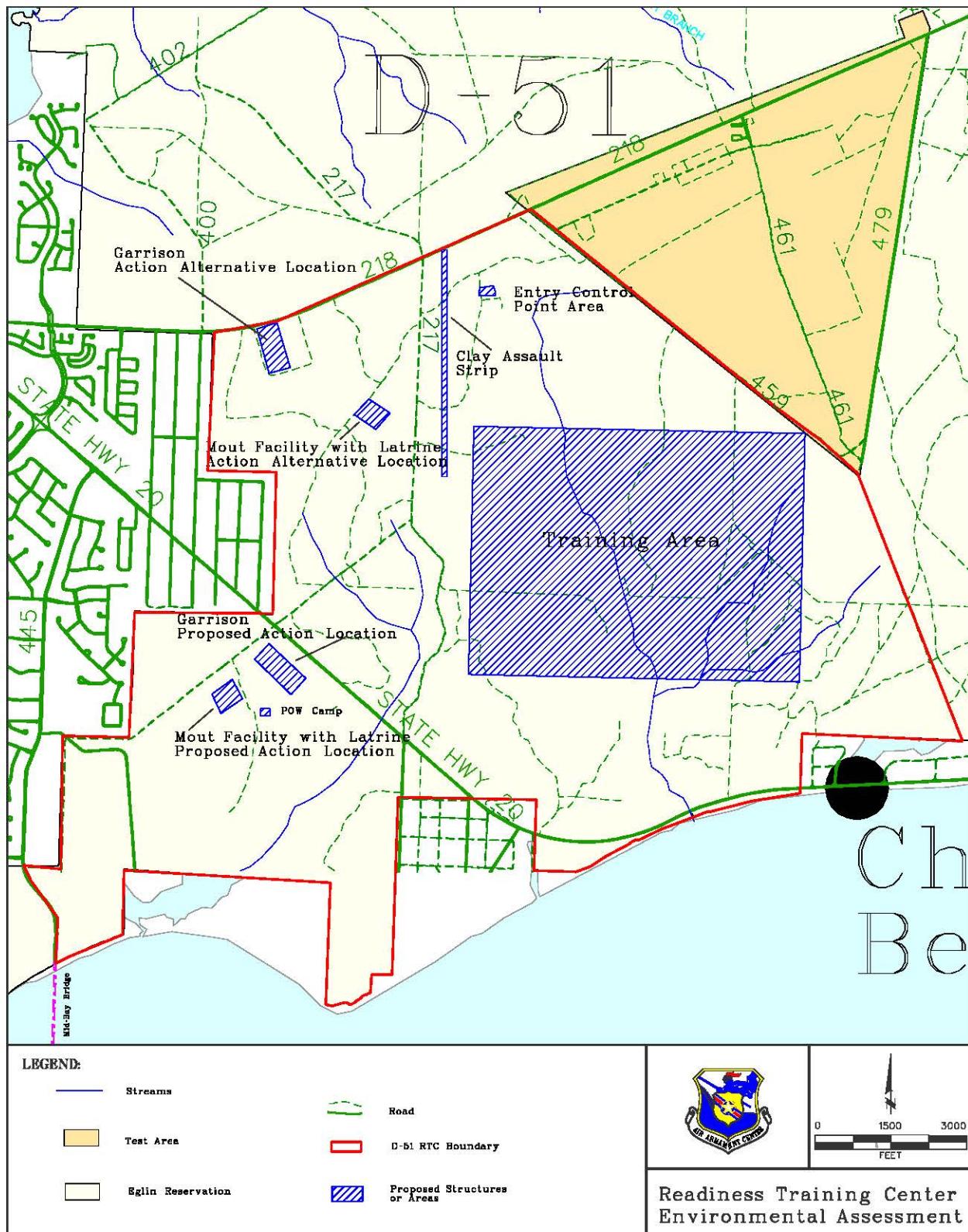


Figure 2-2. D-51 South Training Area

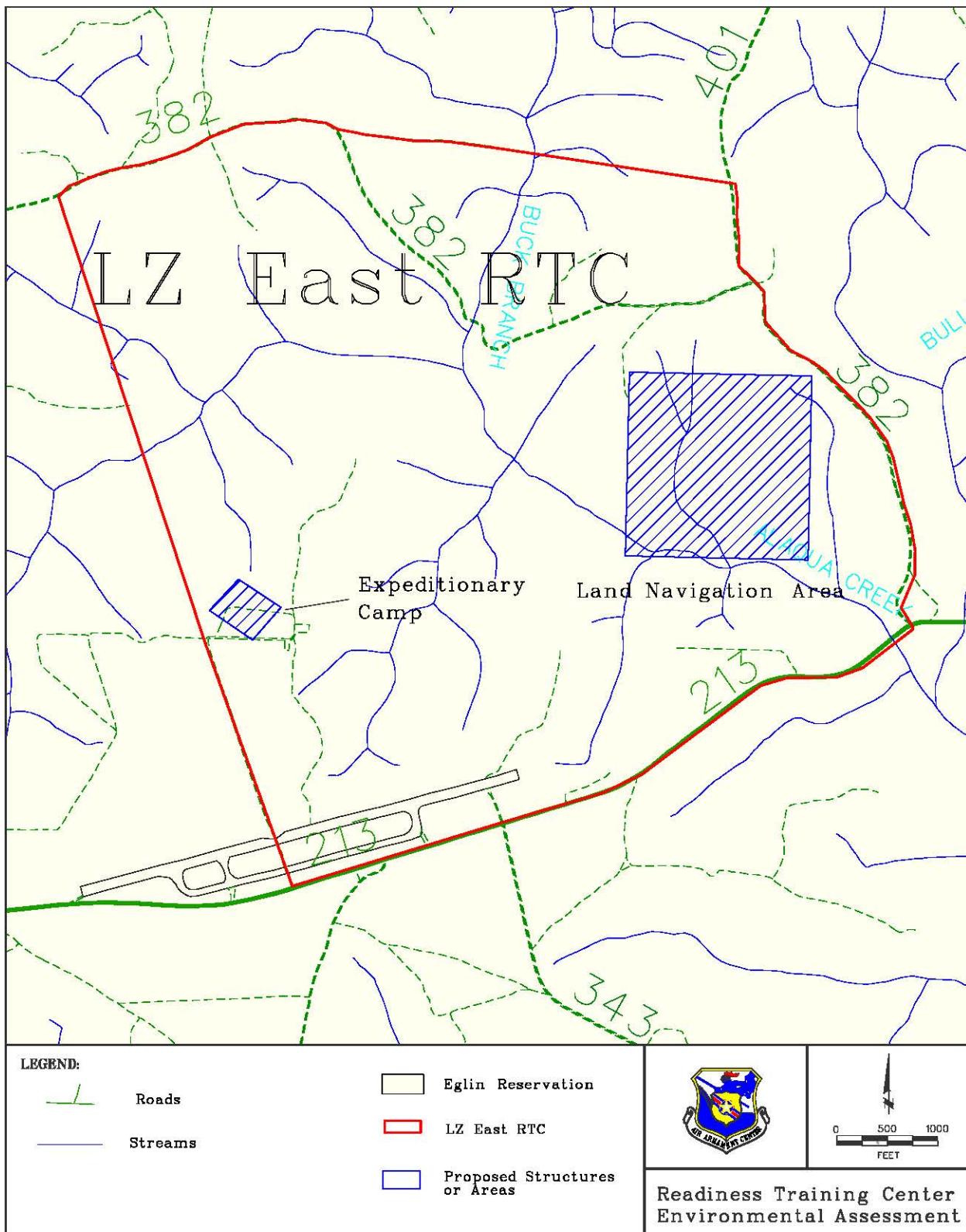


Figure 2-3. LZ East Training Area

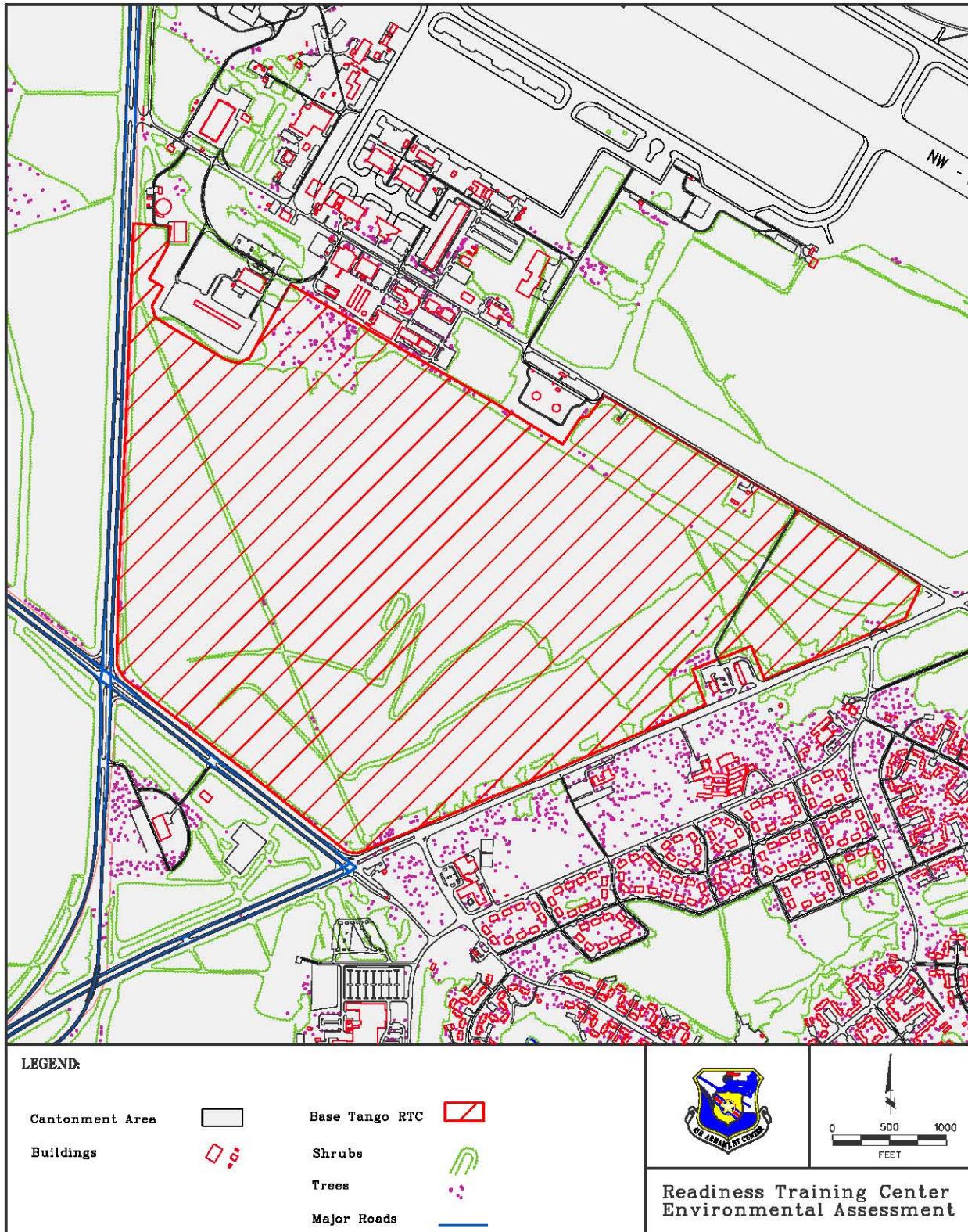


Figure 2-4. Base Tango

Vehicle escorts could occur on any of the roads within the D-51 South area, but most likely on those roads that connect the MOUT village, PoW camp, and other facilities.

Base Tango

To demonstrate the performance of training modules presented during classroom instruction, field exercises would be conducted at Base Tango (Figure 2-4). The 471-acre Base Tango training area is located within the Eglin Main cantonment area adjacent to Highway 85. SF is currently using the area for base defense training and field exercises.

There is 0.33 mile of road within the proposed Base Tango boundary. Approximately 0.16 mile of tertiary road would be upgraded to secondary road standards. The vegetation in the area is longleaf pine/scrub oak except for a 15-acre cleared training area. The cleared training area is maintained to native short grass conditions. The MOUT facility, PoW camp, bivouac area, and entry control point would be constructed without clearing land. A latrine/shower facility 800 square feet in area would be placed at the southeast corner of the MOUT facility. Water and generators would be transported to the site during training. The area would also be used for patrolling and field reconnaissance.

Landing Zone East

The proposed 983-acre LZ East training area would be used as the location of the expeditionary field camp (Figure 2-3). There are approximately 5.6 miles of tertiary sand roads within the proposed RTC boundary. Of these, 2.5 miles would be upgraded to secondary road standards. The existing clay surfaced aircraft runway would be used for vehicle escort and defense training. There are existing concrete pads for erecting bivouac tents and other facilities and an abandoned shed at the expeditionary field camp site (Figure 2-5).

The proposed LZ East training area includes uneven aged timber stands and is divided by stream systems and wetlands that provide a diversity of natural features for training scenarios. Other than establishing a bivouac area, no additional land clearing or construction would be required. The proposed bivouac has been cleared recently and is primarily occupied by grasses, shrubs, and small trees. No mature or old growth trees would be removed. Slash pine has been harvested from the area within the last five years. The training area would be primarily used for patrolling, base defense, vehicle escorts, field reconnaissance, and land navigation. Water, generators, and lavatory facilities would be transported to the site during field training sessions. Communication cables already exist at LZ East (Figure 2-5); however, their condition is unknown.

Description of the Proposed Action and Alternatives



Clay Aircraft Landing Strip

Description of the Proposed Action



Bivouac Concrete Pads



Slash Pine Clearcut



Pole Shed



Bivouac Area



Communication cable Adjacent to Shed

Figure 2-5. LZ East Training Area

2.1.2 Throughput Capabilities and Schedule

Initial throughput for the proposed action would be approximately 308 SF personnel annually, 44 to 88 trainees per 14-day curriculum per 7 sessions annually. Field training would be accomplished during a five-day bivouac. Approximately 10 to 15 instructors would supervise trainees during field training. Bus transportation would be required to move trainees between destinations. In the future (3 to 5 years), the number of trainees could increase to several hundred per session. However, future throughput capabilities and schedule were not available for analysis.

2.1.3 Field Training Activities

Some field craft activities would require between 500 and 600 acres of contiguous land area that includes, to the degree possible, a diversity of natural terrain features. Areas of natural terrain with a thick understory and layers of heavy forest floor litter are important training components. Supervised field training would be conducted day and night; stealth and detection equipment would be used for night operations. General transportation vehicles used would include:

- M-1083 Five Ton Truck
- M-998 HMMWV
- M-1078 2½ Ton Cargo Truck
- Trailer, Truck, Water 400GL
- M-105 Trailer Cargo
- Six Pax 4 × 4
- Truck Utility Four Door 4 × 4
- High Mobility Light Trailer

Assembly and Convoy Operations

Assembly involves the gathering and organization of vehicles, personnel, and equipment before convoying to the field training bivouac area (Figure 2-6A). The assembly mission activity is excluded from analysis since it would be performed at an existing parking lot location near the support facilities. No equipment or personnel would be assembled on natural ground areas, which substantially reduces environmental impact potentials. A convoy is a group of vehicles organized for controlled and orderly movement, with or without escort protection, over the same route at the same time and under one commander.

Bivouacking

Bivouac sites are used to set up temporary shelters and facilities that provide meals and water, parking for vehicle maintenance and protection, and setting up equipment used in conjunction with the training mission (Figure 2-6B). Features of bivouacs include access roads, parking areas, and campsites. Force protection berms one to two feet high are sometimes established

around vehicles, equipment, or shelters. The bivouac is frequently located where vegetation can provide tactical concealment.

Patrolling

A patrol is a detachment of ground forces sent out by a larger unit to gather information or carry out destructive, harassing, mopping-up, or security missions. There are two types of patrols: reconnaissance and combat.

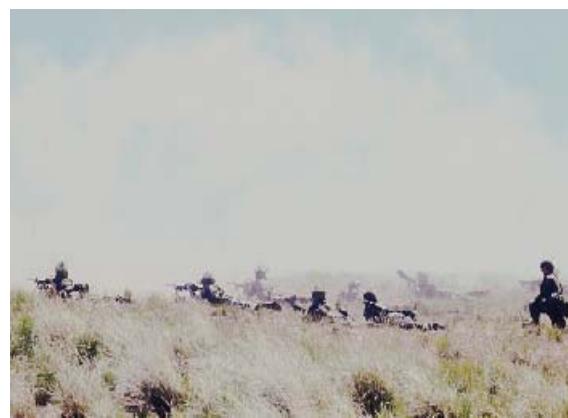
The reconnaissance patrol is used to gather information on the enemy, terrain, and resources. Reconnaissance is a mission undertaken either to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or potential enemy or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area (also called recon). These patrols are normally small, lightly armed, and generally only fight to disengage. If reconnaissance patrols locate the enemy, combat patrols are dispatched. All-terrain vehicles (ATVs) would be used for reconnaissance and patrols over the entire training area (Figure 2-6C).

Combat patrols are conducted to destroy or capture enemy troops or equipment, destroy installations, facilities or key points, or harass enemy forces through raids and ambushes (Figure 2-6D). They also provide security for larger units. Common elements of patrols include headquarters, aid and litter team, prisoner team, surveillance team, enroute recorder, compass person, and pace person. Patrol movements are generally characterized as fan patrols that consist of a series of loops covering an area from a central location and a box patrol that skirts an area boundary normally delineated by topographic features.

For the proposed action, a reconnaissance patrol would normally consist of two teams of 4 to 8 troops, and a combat patrol would consist of 13 to 88 troops. A training supervisor would accompany each team. Reconnaissance patrols would primarily be conducted at night using night vision equipment and listening devices. During daylight, teams would try to remain secluded. In some instances, teams would be allowed to stay overnight at their positions; however, no campfires would be allowed. Following engagement or disengagement activities, expended ammunition casings and smoke grenades would be recovered.

Base Defense Operations

Base defense consists of local military measures, both routine and emergency, required to nullify or reduce the effectiveness of enemy attacks on, or sabotage of, a base, to ensure that base facilities are available at maximum capacity to U.S. forces. Ground defense positions are natural or constructed fortifications that provide tactical boundary primary firing positions. These 12 crew-served positions would be three feet wide, six feet long, and three to five feet deep. Each position would typically be manned by two troops armed with an M16 and M60. Defense positions would be engaged by enemy reconnaissance teams to pinpoint their number and location. Defense positions would be refilled during move-out operations.

**Figure 2-6A. Typical Assembly****Figure 2-6B. Typical Bivouac Area****Figure 2-6C. Field Reconnaissance/Patrolling ATVs****Figure 2-6D. Patrol Combat Engagement Training****Figure 2-6. RTC Field Training**

Vehicle Escorts

An escort comprises combat forces of various types provided to protect other forces against enemy attack. The vehicle escort movement of personnel and/or supplies is the primary role of security police in motor movements. Prior to escort training activities, an actual or map route reconnaissance is conducted. Escorts will be armed with M16s and an M60. The types of vehicles (Figure 2-7) that could be used by the vehicle escorts are:

- M35, 2.5 ton, 6 x 6 Utility Truck
- High Mobility Multi-Wheeled Vehicle (HMMWV)
- M1008, 0.5 ton Tactical Cargo Vehicle
- M1009, Tactical Cargo Truck
- M923/925, 5 ton, 6 x 6 Utility Truck

Due to terrain and history of damage potential in a full equipment-training environment, M-35 and five-ton transport with troop seating and canvas weather covers would be preferred for transport in and around the loose sandy terrain anticipated in field training areas. Based on

vehicle use rates and types, maintenance would be performed on-site, since vehicle maintenance delay could halt training.



Figure 2-7. RTC Escort Vehicles

The combinations and number of vehicles used during a training escort depend on the size of the convoy, the number of personnel required, the threat being addressed, and the weapons being utilized by the escort team. Ideally, four escort vehicles are used during a training mission. VIP escorts typically consist of at least two vehicles.

During a disabled vehicle exercise, the vehicle(s) would pull off the road and troops would take defensive positions, whereas during an ambush the vehicles could remain on the roadway and troops would return fire and exercise disengagement measures in anticipation of a probable air strike. Off-road wheel tracking created by escort vehicles during training would be limited to areas immediately adjacent to the roadway. Two to three vehicle escort exercises would be performed during the training period.

Ordnance Expenditures

The types and estimated amounts of munitions expended during patrolling, vehicle escorts, and/or manning ground defense positions are listed in Table 2-1. Each weapon is assigned 300 rounds of ammunition that must last for the duration of the monthly five-day field-training

session. Each field training session would average 88 trainees. No live ammunition would be expended during the proposed RTC training activities.

Table 2-1. Estimated RTC Training Mission Expenditures

Munition Type	Expenditures	
	During Field Training Session	Rounds Expended Yearly
M-16 5.56 mm Blanks	300 rounds/ 88 trainees/session	184,800
M-60 7.62 mm Blanks	300 rounds/ 10 trainees/session	21,000
Smoke Grenades	100/session	700
Battlefield Sound Simulator	3/session	21

Session = 5 days of Expeditionary Field Camp training following one week of classroom training; 7 sessions per year

Smoke grenades would be used by patrols and vehicle escort teams during disengagement activities. Two battlefield sound simulators would be used to simulate mortar and artillery fire and high explosive demolition for combat conditioning. The device operates on the oxygen-propane principle where gases are metered through solenoid valves with a timing device initiating a spark in the gas-filled chamber to cause the explosion. It can be fired in a single shot or a sequence of six shots at 10-second intervals. A trigger switch is used to fire the device from a remote location. During normal firing, the device is safe at a distance of 10 feet.

Two pits four feet deep and four feet square are required. One pit is used for the explosion chamber and the other pit is for the oxygen and propane cylinders and the timing box assembly. The pits are separated by at least one foot of earth and reinforced by four by four inch corner posts with two by six inch sideboards to prevent pit wall collapse.

No firing of small arms, smoke grenades, or pyrotechnics within or into wetlands or into surface waters would occur. Debris materials from these expenditures would be collected.

2.1.4 RTC Features and Construction Requirements

Various levels of land disturbance construction are required to improve access, establish permanent facilities, and create on-site training structures. Permanent garrison and expeditionary field camps are required, roads must be constructed or upgraded to ensure access and facilitate a condition amenable to field training scenarios. Permanent features such as MOUT village, garrison, and entry control point structures are required to instill realism into training modules. The proposed RTC requirements are discussed in the following sections.

Garrison Facility

A garrison includes all the units assigned to a base or area for defense, development, operation, and maintenance of facilities. Features of a permanent garrison training area include classrooms and offices, dorm/billeting, dining hall, equipment and weapons storage, warehousing, parking areas, and vehicle maintenance bay. The garrison compound will occupy approximately 10 acres and create 348,480 square feet (8 acres) of impervious surface. Approximately 6,000 square feet of equipment storage space for up to 60 weapons and training munitions is required.

Construction plans that identified the number and size of buildings were not available; however the infrastructure would be similar to facilities at Camp Rudder although the building layout and configuration would likely be different.

Expeditionary Field Camp

An expeditionary force is an armed force organized to accomplish a specific objective in a foreign country. The expeditionary field camp (EFC) bivouac consists of hardback tents, field chow hall, fuel point, latrines, and showers normally located in proximity to the field airstrip, MOUT area, and austere training environment. Construction requirements include four to six concrete slabs that are 10 feet by 6 feet (60 square feet) creating a total of 360 square feet of impervious surface. Mobile communications and water source would be used. Vegetation at the selected locations would only be partly thinned to maintain concealment.

Roads

The proposed action requires the upgrading of existing unpaved roads and construction of new unpaved roads. Roads provide access to facilities and training areas and are used by trainees for operations such as vehicle reconnaissance and vehicle escorts. During the road upgrading process, existing tertiary and unclassified sand roads would be reconstructed to **secondary** clay road specifications.

Road upgrading refers to the mechanical reconstruction of the roadbed and right-of-way to meet increased transportation requirements. In some cases, tertiary and unclassified roads would need to be upgraded to secondary road conditions to support use by heavy transport and supply vehicles used during convoy and/or escort training activities. Road upgrading falls into two disturbance categories: removal of vegetation to increase the width of the roadway and creation of an impervious roadbed configuration using compacted clay fill material. The new secondary roadbed would be constructed at an elevation and contour that would enable runoff to quickly drain into roadside drainage systems and provide a better and safer road surface. Standards for unpaved primary, secondary, and tertiary roads reconstruction are presented in Table 2-2. For the RTC, roads would be upgraded to secondary standards.

The new road construction of the proposed action would be the establishment of improved roads as a component of the garrison facility, entry control point training area, and MOUT village. The garrison facility and MOUT village new road construction would not require additional clearing since these roads would be within the defined construction area. The entry control point would require an entry and exit road to tie back into an existing road. These roads would be designed and maintained to tertiary or secondary road standards as required by trafficking needs.

Mock Airstrip

A mock airstrip would be constructed at D-51 South to provide a realistic stage on which to perform vehicle escorts and runway defense. The airstrip would be 4,440 feet long and 100 feet wide (68.87 acres). The airstrip would be constructed to secondary unpaved clay road specifications to support repeated use during training sessions and minimize vegetation management requirements. Land clearing would be required to construct the clay airstrip.

Table 2-2. Eglin Civil Engineering Maintained Road Standards

	Primary	Secondary	Tertiary
Maximum Cleared Right-of-Way	70 feet	70 feet	50 feet
Width of Road (Shoulder to Shoulder)	34 feet	26 feet	22 feet
Aggregate/Clay Depth (Average Compacted)	6 inches	6 inches	4 inches
Aggregate/Clay Width	24 feet	16 feet	12 feet
Maximum Degree of Horizontal Curve	10°	20°	30°
Maximum Adverse Grade	6%	8%	10%
Maximum Favorable Grade	10%	12%	12%
Minimum Depth of Ditch	1.5 feet	1.5 feet	1.5 feet
Cross Slope of Grade	0.25 inch/foot 3 inch crown	0.25 inch/foot 2 inch crown	0.25 inch/foot 1.5 inch crown
Fill Slope			
Rock Aggregate	1:1	1:1	1:1
Clay/Sand	2:1	2:1	2:1
Cut Slope			
Rock Aggregate	2:1	2:1	2:1
Clay/Sand	2:1	2:1	2:1

Source: U.S. Air Force, 2001, Eglin Air Force Base Range Road Maintenance Handbook

MOUT Village

Military operations in urban terrain (MOUT) are operations planned and conducted in one or more urban areas. The urban area is a topographical complex where manmade construction or high population densities are the dominant features. The urban battle space includes urban airspace, buildings, street level surface, and subsurface (sewers, tunnels, and/or subways) features. MOUT training is conducted within small city or village recreations of an urban battle space (Figure 2-8).

The proposed RTC MOUT village would include three one-story and three two-story cinder block buildings constructed on concrete slabs. The total area of the MOUT village would be one acre (43,560 ft²), all of which would be impervious surfaces. An example of a MOUT village layout that shows the general configuration and juxtaposition of buildings and roads that would serve as a general guide for building and street layout for the proposed RTC on Eglin is presented in Figure 2-9.

Description of Proposed Action and Alternatives



Description of the Proposed Action



Figure 2-8. MOUT Village Buildings and Training

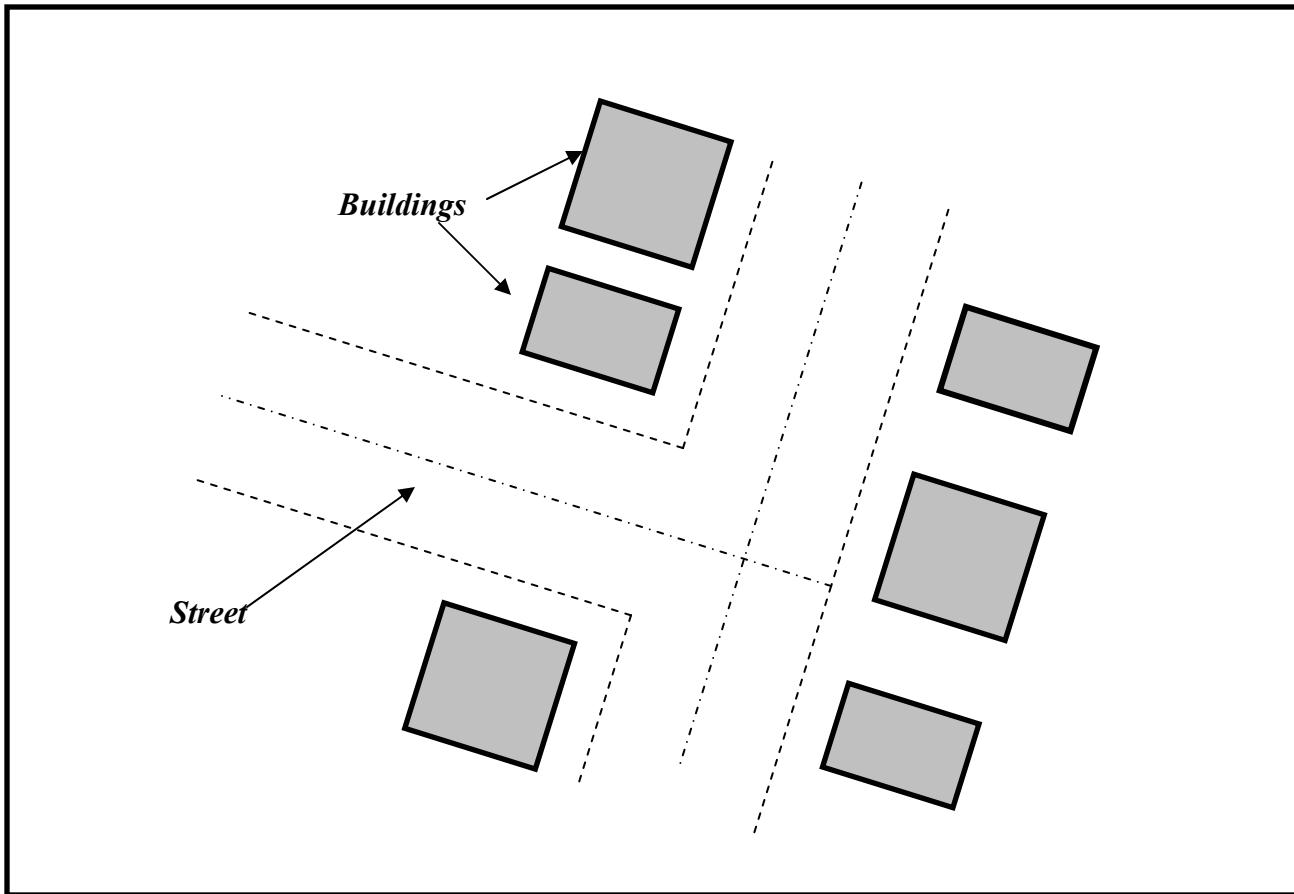


Figure 2-9. Typical MOUT Village Layout

PoW Camp

The camp would be a one-acre area surrounded by perimeter wire (Figure 2-10). No concrete pads or other impervious surface features would be required. No impervious surfaces would be created by PoW camp construction; however, land clearing would be required.

Entry Control Point

A mock-up of an entry control point (ECP) requires the construction of an access road, vehicle undercarriage examination pit, and pop-up road barriers. The examination pit is approximately 25 feet long, 5 feet wide, and 7 feet deep. The floor of the pit is lined with gravel, and the pit walls are supported with wood framing. The pop-up barrier is either a hydraulic or manually operated mechanism. The ECP access road is U shaped, connects to an existing road, and is surfaced with gravel or other materials. The ECP area would also be used for checkpoint operations, explosive threats, portable sensors and alarms, barriers, and obstacles and wire. Construction of the control entry facility would create approximately 1.3 acres of impervious surface.



Figure 2-10. Example of Wire Configuration Used for a PoW Camp Perimeter

2.2 ALTERNATIVES

Alternatives to the Proposed Action include the No Action Alternative and an Action Alternative.

2.2.1 No Action Alternative

Under the No Action Alternative an AFMC RTC would not be established at Eglin AFB. AFMC would continue to depend on Air Combat Command (ACC) and Air Mobility Command (AMC) to provide SF protection and ground combat training.

2.2.2 Action Alternative

The Action Alternative is exactly the same as the proposed action in all respects with the exception of constructing the garrison and MOUT facility **north** of Highway 20, which is a less expensive option than the Proposed Action due to the existence of water, power and communication utilities at that site. Utilities for the garrison and MOUT are not currently present at the Proposed Action site, south of Highway 20.

2.2.3 Alternatives Considered But Not Carried Forward

There have been previous efforts to locate a regional ground combat training center at Eglin AFB. Of the various alternatives investigated, the Duke and Choctaw Field areas received extensive review and analysis before being rejected as viable alternatives. The document *Air*

Force Materiel Command Regional Ground Combat Training Center Draft Final Environmental Assessment (U.S. Air Force, 2001) provides a detailed analysis of potential environmental impacts associated with these alternatives. Other alternatives considered included Auxiliary Field 5/B-4 and Auxiliary Field 2/C-3. These alternative locations were eliminated from further analysis due to mission conflicts.

2.3 COMPARISON OF ALTERNATIVES

Table 2-3 provides a comparison of alternatives and potential impacts for the affected environment.

Table 2-3. Summary Matrix of Issues, Proposed Action, Alternatives, and Potential Impacts

Issue	Proposed Action	Action Alternative	No Action
Water Quality/Wetlands	Wetlands would be avoided. Road repairs associated with the proposed action would alleviate erosion in some areas and have a positive effect on water quality of nearby surface waters.	No difference from the Proposed Action. Wetlands would be avoided. Road repairs associated with the action alternative would alleviate erosion in some areas and have a positive effect on water quality of nearby surface waters.	Water quality would remain the same or worsen as the existing condition of some roads would continue to deteriorate.
	Potable water would be transported onsite. Wastewater would be collected and disposed offsite.	Potable water would be transported onsite. Wastewater would be collected and disposed offsite.	
Air Quality	No impacts to air quality would result. No thresholds would be exceeded.	No impacts to air quality would result. No thresholds would be exceeded.	No impacts
Cultural Resources	Cultural resources have been surveyed and will be avoided. New discoveries would be reported to AAC/EMH.	No difference from the Proposed Action. Cultural resources have been surveyed and will be avoided. New discoveries would be reported to AAC/EMH.	No impacts
Restricted Access	Minimal effects would occur. At D-51 South, approximately 2,700 acres of Management Area 13 would be closed and approximately 642 acres of outdoor recreation lands would be closed. Lands at LZ East are already restricted.	No difference from the Proposed Action. Minimal effects would occur. At D-51 South, approximately 2,700 acres of Management Area 13 would be closed and approximately 642 acres of outdoor recreation lands would be closed. Lands at LZ East are already restricted.	No impacts
Habitat Alteration	Approximately 15 acres of Tier III scrub would be cleared for a garrison and MOUT. Widening of roads would affect an estimated 24 acres of mostly scrub and longleaf habitat. Upgrading roads and installing culverts at areas that cross wetlands would have positive effects on habitats by controlling erosion that is already occurring. About 850 acres of potential gopher tortoise habitat would be encompassed at the LZ East and D-51 South areas.	Locating the garrison north of Highway 20 would impact 10 acres of longleaf pine; the alternative MOUT location would require clearing of 5 acres of sand pine. Clearing longleaf pine is generally not desirable. The amount of roads that would need upgrading is approximately the same as the proposed action. Widening of roads would affect an estimated 24 acres of mostly scrub and longleaf habitat. Upgrading roads and installing culverts at areas that cross wetlands would have positive effects on habitats by controlling erosion that is already occurring.	No impacts.

Issue	Proposed Action	Action Alternative	No Action
	The proposed action has slight fewer habitat alteration effects than the alternative based on the fact that less longleaf pine would be affected.	About 850 acres of potential gopher tortoise habitat would be encompassed at the LZ East and D-51 South areas.	
Noise	Noise thresholds for public annoyance would not be exceeded in residential areas. However, more residential areas would be exposed to small arms noise than with the action alternative.	Noise thresholds for public annoyance would not be exceeded in residential areas. A comparatively lower area of residential property would be exposed to small arms noise.	No impacts
Biological Resources/T&E Species	About 850 acres of potential gopher tortoise habitat would be encompassed by the training areas. Though not federally protected, the gopher tortoise constructs burrows used by other species that are protected. Effects from road clearing and construction activities, which are the most impactful by nature, would be minimized by surveying the areas to be cleared for gopher tortoise burrows.	About 850 acres of potential gopher tortoise habitat would be encompassed by the training areas. Though not federally protected, the gopher tortoise constructs burrows used by other species that are protected. Effects from road clearing and construction activities, which are the most impactful by nature, would be minimized by surveying the areas to be cleared for gopher tortoise burrows.	No impacts

3. AFFECTED ENVIRONMENT

The affected environment is comprised of the southern and western portions of Test Area D-51 identified as D-51 South, an area north of Landing Zone (LZ) East and Base Tango on Eglin Main. This section describes the physical, biological, and anthropogenic features at these locations that may potentially be impacted by the proposed action and alternative.

Section 3.1 describes the physical setting in which the proposed action would take place. Section 3.2 describes physical features such as geomorphology, soils, hydrology, and meteorology. Section 3.3 describes biological resources such as habitats, wildlife and protected species that may occur at the proposed action and alternative sites. Section 3.4 discusses anthropogenic features including historic and prehistoric cultural resources, Installation Restoration Program (IRP) sites, and unexploded ordnance (UXO).

3.1 PHYSICAL RESOURCES

The following subsections describe the geomorphology, soils, hydrology, and meteorology of the affected environment.

3.1.1 Geomorphology

Geomorphology is the study of the origins and development of landscapes. Of particular importance to this review is identifying and describing the unique landscape characteristics and potential interactions of the proposed RTC. Geomorphology is particularly important to understanding surface hydrology and geohydrology. The following sections discuss geology, physiography, and stratigraphy in relation to the Proposed Action and Action Alternative.

Geology

Millions of years ago, Florida began as limestone formed at the bottom of a shallow sea. Panhandle Florida has been slowly emerging from the sea since at least some time in the Miocene geologic period. The age of surface sediments, therefore, is older near the Alabama and Georgia borders and becomes progressively younger toward present sea level. The floor of each stand of the sea was a relatively flat, gently seaward-sloping terrace when first exposed by the receding shoreline. Terraces are separated from each other by step-like escarpments or by subtle changes in relief. Since their emergence, terraces have been eroded and dissected by streams and rivers. Entire strata have been removed in some areas, and materials from other strata have been deposited on top of lower terraces and rearranged by the erosive power of water (Wolfe et al., 1988).

Physiography

D-51 South and Base Tango are located in the Gulf Coastal Lowlands physiographic region; LZ East is located in the Northern Highlands physiographic region. The general characteristics of these physiographic regions are discussed below.

Northern Highlands

The Northern Highlands (NH) are relatively higher elevation lands extending across Alabama, Georgia, and northern Florida. The northern section of the Eglin reservation lies in the Western Highlands (subdivision of the Northern Highlands), which is underlain by delta deposits of clay, clayey sand, and gravel of the Citronelle Formation of Pliocene-Pleistocene Age. The surface of these ancient deltas has been dissected by streams exposing underlying Miocene deposits. The topography is characterized by erosional remnant hills composed of assorted mixtures of grayish to yellowish-orange silts, quartz sands, and gravels. Elevations in the region range from about 100 to over 200 feet above mean sea level (MSL).

Gulf Coastal Lowlands

The Gulf Coastal Lowlands (GCL) are a series of coast-parallel terraces composed of clastics (i.e. consisting of rock or mineral fragments) that extend to higher inland elevations; terraces are separated by an escarpment or gentle slope. Eglin Main, Hurlburt Field, and the southern mainland portions of Eglin AFB lie in the GCL and are generally characterized by beach ridge plains, shorelines, and marine terraces formed during the Pleistocene Epoch or Ice-Age between 10,000 and 1.8 million years ago. The terrace complexes are predominantly underlain by sand with local occurrences of clay, shell beds, and peat. The inland elevations of the terraces occur at about 150 feet, 100 feet, and 35 feet. The terrace is present at approximately 10 feet but is poorly preserved (Schmidt, 1984). Elevations in these lowlands range from 0 to 100 feet above MSL (Northwest Florida Water Management District, 1982).

Stratigraphy

Stratigraphy is a term used to define distinguishable layers or strata of earth materials. Geologic formations that occur on Eglin AFB, from youngest to oldest, include undifferentiated Pleistocene-Holocene (11,000 years ago to present) Terrace and Stream Sediments, Pleistocene Citronelle Formation, Miocene-Pliocene (1.8 to 23 million years ago) Coarse Clastics, Miocene Alum Bluff Group, and Pensacola Clay (Marsh, 1966; Clark and Schmidt, 1982; Schmidt, 1988). Generally the upland portion of the reservation is blanketed by as much as 250 feet of primarily nonmarine quartz sands with some gravel and relatively thin clay lenses of the Citronelle Formation. The distribution and character of the Citronelle sediments suggest that they are coalescent deposits of several early rivers that emptied into the Gulf of Mexico. For this reason, few outcrops can be correlated, as most clay lenses and gravel beds are discontinuous (Clark and Schmidt, 1978).

The D-51 South and Base Tango areas are dominated by Pleistocene-Holocene Terrace and Stream sediments, while the LZ East area is inclusive of the Pleistocene Citronelle Formation and Miocene Alum Bluff Group. These geologic formations are detailed in Appendix B.

3.1.2 Soils

For the purposes of this discussion, “soil” is a natural body composed of solids, liquid, and gases that occurs on the land surface and is characterized either by horizons or layers distinguishable from the parent material as a result of additions, losses, transfers, and/or transformations of

energy and matter or by the ability to support rooted plants in a natural environment (USDA, Natural Resources Conservation Service, 1998). A preeminent characteristic of Eglin reservation soils is the broad distribution and, in most cases, dominance of quartz sand. Additional features characteristic of the soil environment include the following:

- Soil moisture and water-holding capacity is a key determinant of soil productivity. Excessively sandy soils retain very small amounts of available water, and clayey soils retain much greater amount of available water.
- The relatively mild humid climate and high rainfall result in the rapid depletion of basic cations such as calcium, magnesium, potassium, and sodium through leaching.
- Generally, soils are characterized by low values for extractable bases and cation exchange capacity (CEC), which signifies inherent low soil fertility.
- Organic matter generally decreases rapidly with increasing depth; organic matter in the surface layer is directly related to nutrient- and water-holding capacity of sandy soils.

Soil texture (sand, silt, and clay) accounts for much of the variability in land productivity and plant communities. Compared to sands, clays and silts are capable of holding more soil moisture and nutrients, which increases potential plant species composition and soil productivity. The variability and subsequent land productivity potentials of the dominant Lakeland and Troup soils on the Eglin reservation is primarily determined by silt content. The depth of the clay layer, which affects soil moisture, also influences the distribution of Longleaf Pine Sandhills (LPS) native plant species.

In a plot study near Test Area A-78 in the southwestern part of the reservation, silt content varied between 7.7 percent (Lakeland) and 10 percent (Troup) resulting in a variation in vegetation between soils. Generally, plots with the highest amount of silt contained the lowest organic matter and total nitrogen concentrations. In the sandhills, values for organic matter and nitrogen are naturally low, bordering on undetectable. This may be explained by the fire regime associated with increased plant productivity, since fire reduces both organic matter and nitrogen (Provencher et al., 2001).

The physical and chemical nature of soils directly influences the adverse impact potentials of training activities on water quality, habitat alteration, and cultural resources. Potential degradation of the physical and chemical qualities of the soil associated with activities such as soil excavation and compaction from foot and wheel traffic reduces the capacity of the soil to support biological and hydrologic functions essential to ecosystem viability.

Soil Moisture

Soil moisture is the portion of soil water that supports vegetation. The moisture content of soil horizons varies with the seasons; a soil may be continuously moist in all or some horizons throughout the year or for part of the year. Soil moisture can be increased by irrigation and decreased by drainage (Morgan, 1995).

At Eglin, soil moisture is a primary limiting factor that determines the form and function of ecosystems. Changes in soil moisture can alter the vegetation composition of ecosystems and

subsequently the availability of wildlife habitats. Studies of Sandhill ecosystem sandy soils on the reservation identified soil moisture as a determining factor of native plant community composition, diversity, and productivity (Provencher et al., 2001). The following section discusses the classes of soil moisture, known as “soil moisture regimes.”

The soil moisture regime is the groundwater or other water held at tension of less than 1,500 kPa in the moisture control section. At a tension of 1,500 kPa or more, water is not available to keep most plants alive (USDA Natural Resources Conservation Service, 1998). The soil moisture regime, whether dry (greater than 1,500 kPa) or moist (less than 1,500 kPa), determines the types of vegetation the soil is capable of supporting. The classes of soil moisture include the aquic, aridic, udic, ustic, and xeric regimes (USDA Natural Resources Conservation Service, 1998).

The characteristics of the soil moisture regime determine the type of native vegetation the landscape is capable of supporting. A description of the udic and aquic soil moisture regimes and associated soil series that occur on the proposed D-51 South, LZ East, and Base Tango training areas are discussed below. Base Tango has only the udic soil moisture regime.

Udic Moisture Regime

The udic regime is common to humid climates that either have well-distributed rainfall, enough summer rain so that the amount of stored moisture plus rainfall is equal or greater than the amount of evapotranspiration, or adequate winter rains to recharge the soil. At some time during a normal year, water moves down through the soil profile. Soils having an extremely wet condition with water moving through the soil profile in most months are identified as having a perudic soil moisture regime (USDA Natural Resources Conservation Service, 1998).

D-51 South soils with udic soil moisture regimes include Eglin, Foxworth, Fuquay, and Lakeland soils. LZ East soils with udic soil moisture regimes include Angie, Bonifay, Bonneau, Florala, Foxworth, Fuquay, Lakeland, Leefield, Norfolk, Stilson, and Troup soils. The Base Tango soil with a udic soil moisture regime is Lakeland Sand.

Aquic Moisture Regime

Aquic refers to a saturated soil that either exhibits anaerobic conditions and is virtually free of dissolved oxygen or has oxygen present because of flowing water or has conditions unsuitable for microorganisms. Specific duration of saturated condition is unspecified, but it is implicit that the soil be virtually free of dissolved oxygen. Removal of dissolved oxygen from groundwater by plant roots, soil fauna, and the respiration of microorganisms normally requires a few days. Soil temperatures must be above 5°C (biological zero) for some time while the soil is saturated. Groundwater levels commonly fluctuate with the seasons; in some soils, the water table is at or near the surface throughout the year. Examples include tidal marshes, swamps, depressions fed by springs, and perennial streams (USDA Natural Resources Conservation Service, 1998).

D-51 South soils with aquic soil moisture regimes include Dorovan and Pamilco soils. LZ East soils with aquic soil moisture regimes include Bibb, Dorovan, Johnston, Kingston, and Pamilco soils. Base Tango does not contain soils with aquic soil moisture regimes. The following

subsection discusses the soil series that occur on the proposed D-51 South, LZ East, and Base Tango training areas.

Soil Series

The primary source of soil information for identifying and characterizing soils that occur within the proposed training areas was the U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Okaloosa County Florida (1995) and Soil Survey of Walton County Florida (1989). Appendix B summarizes the physical and chemical characteristics of each soil series.

D-51 South Soil Series

The soil series that occur within the realm of influence of the proposed D-51 South training area include upland (udic) Chipley Sand, Eglin Sand, Foxworth Sand, Fuquay Loamy Sand, Hurricane Sand, and Lakeland Sand soils and wetland (aquic) Dorovon Muck and the Dorovon-Pamlico Association soils. The distribution, proportion, and arrangement of these soils on the land are directly related to their association with certain types of landforms. Lakeland sand covers the majority of the D-51 South training area.

LZ East Soil Series

The soil series that occur within the proposed LZ East training area include upland (udic) Bonneau-Norfolk-Angie Complex, Chipley Sand, Fuquay Loamy Sand, Florala Loamy Fine Sand, Lakeland Sand, Leefield-Stilson Loamy Sand, and Troup Sand and wetland (aquic) Dorovon-Pamlico Association and Kinston-Johnston-Bibb Association soils.

Base Tango Soil Series

The proposed Base Tango training area is composed entirely of Lakeland sand. No wetland soils occur within the proposed area.

3.1.3 Hydrology

The primary driver of the perennial stream flow in most Eglin streams is not surface runoff but groundwater seepage and spring flow through a highly permeable surficial medium. Hydrologic attributes important to the form and function of proposed training area ecosystems include:

- Physical and/or chemical disruption of the soil environment affects groundwater, stream, and wetland hydrology, and alters the condition of ecosystem flora and fauna.
- Drainage density and clay content generally increase in a west to east direction across the reservation.
- Surficial Aquifer (SA) groundwater seepage and spring discharge is a primary component of streamflow.
- Subsurface clay lenses and cemented sandstone hardpans associated with some geologic formations impact groundwater flow regimes and surface water residence.

- Natural erosion associated with stream entrenchment and unabated erosion caused by human disturbances frequently exposes subsurface geologic formations and dramatically increase stream sediment loading.

Surface Runoff

Generally, rainwater deposited on the surface of proposed D-51 South, LZ East, and Base Tango training areas infiltrates into the soil profile or moves across the surface as runoff. Although the proposed training areas are dominated by soils with a sandy surface texture and rapid water infiltration rates, the terrain is still capable of producing substantial amounts of stormwater runoff.

Perched Water Table

A localized, relatively impermeable lens or layer within a soil formation hindering the free movement of water is called an aquitard or perched water table (Figure 3-1). In the eastern portion of Eglin, perched water tables are instrumental in the development of seepage slopes. A seepage slope is a small, grass/sedge/forb dominated wetland occurring along a gentle slope intersection of the horizontal water table over a broad area. They occur on slopes with constant seepage from a perched water table where the ground is saturated but rarely inundated. Typically, soils are nutrient poor, acidic, loamy sands with high organic content. Although defined as wetlands, seepage slope bogs can experience soil moisture gradient extremes. The seepage slope north of LZ East is likely associated with the presence of a perched water table. Perched water tables are less likely to occur in the areas of D-51 South and Base Tango.

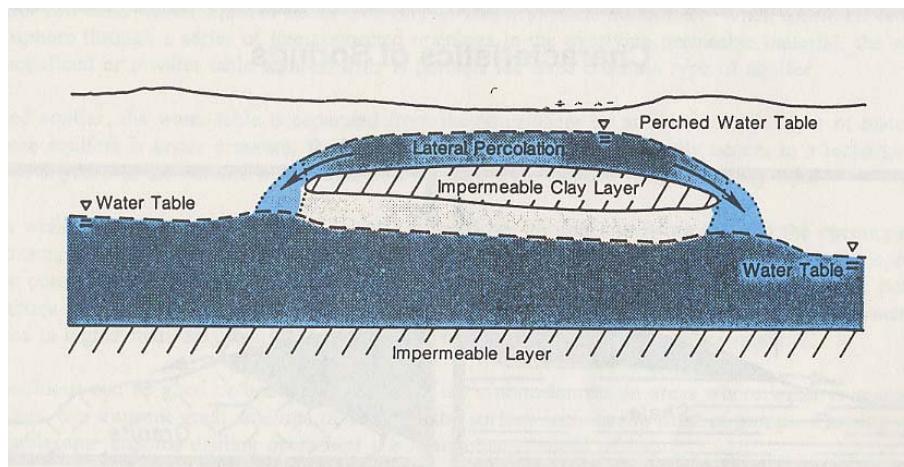


Figure 3-1. Perched Water Table
(U.S. Department of Agriculture, Soil Conservation Service, 1989)

Groundwater

Rainfall that percolates down through the soil is primarily responsible for the recharge of the SA. The SA is primarily composed of clean, fine-to-coarse sand and gravel, some silt and silty clay, and sparse amounts of peat (U.S. Air Force, 1995). The sand and gravel components allow water

to percolate through the SA with relative ease. The thickness of the SA ranges from less than 50 feet (in eastern Walton and central Okaloosa County) to greater than 500 feet (in western Escambia County). Water exists in mainly unconfined conditions (water table) in the upper portion of the aquifer and semiconfined conditions (under pressure) in the lower portion of the aquifer.

The SA system directly contacts surface waters such as streams and wetlands. Because of the confining nature of the underlying Intermediate System, recharge of the SA tends to flow laterally in a downgradient direction toward the entrenched valleys and steephead slope stream systems that are characteristic of Eglin. Discharge of groundwater constitutes the baseflow for most rivers and streams (SAIC, 1999). The position of the SA near the surface and above the confining Intermediate System and its relatively high percolation rates make the SA vulnerable to contamination by surface pollutants. Lateral migration of contaminants toward surface water discharge points potentially facilitates the transfer of groundwater pollutants to area streams, rivers, and wetlands.

The thickness of the SA system is estimated to be 60 to 75 feet for D-51 South, 124 feet at Base Tango, and 87 feet at LZ East. The generalized potentiometric surface of the SA system ranges from 10 to 30 feet for D-51 South, approximately 20 feet for Base Tango, and 140 to 160 feet for LZ East (Northwest Florida Management District, 1993).

Stream Systems

Primarily as a result of a predominant sandy soil texture and subsurface geology, streams and creeks fed by groundwater seepage are widespread over much of the reservation. Eglin Natural Resources has emphasized the importance of these systems by placing a 100-meter buffer around all streams; these buffered areas account for 22 percent (approximately 100,000 acres) of the reservation.

A prominent geomorphic feature of the Eglin reservation is the steephead seepage stream. Eglin contains the highest number of these systems under single ownership in Florida. These unique self-sustaining ecosystems are created from the bottom up by a process known as spring sapping. Steepheads form in conditions where indurated (i.e. hardened or packed) sands and sandy clays overlie slightly indurated sands and clays or shell marls; groundwater that reaches the underlying, less permeable clays or marl emerge as springs (FNAI, 1997). Because of the predominance of steep valley slopes, these systems are highly susceptible to soil erosion associated with close proximity land disturbance or alteration of natural drainage patterns. Steephead formation processes are discussed in Appendix B.

D-51 South Stream Systems

Although the Floridan aquifer is not hydraulically connected to the streams of Eglin, the SA is in direct hydraulic contact with the stream systems of D-51 South. The close relationship between groundwater and surface water means streamflow remains fairly constant throughout the year (Resource Consultants and Engineers, Inc., 1993).

The perennial stream systems within the boundaries of the proposed D-51 South RTC include Mullet, Piney, Eagle, and Little Trout Creeks. These creeks have low sinuosity and are primarily

fed by groundwater seepage flow. All but Little Trout Creek flow directly into the Choctawhatchee Bay. Trout Creek flows into Pippin Lake, which is an artificial lake created by developers. Sharon Lake is another artificial water body partly within the proposed D-51 RTC southern boundary. The headwaters for Little Trout and Eagle Creeks originate within D-51 South (Figure 3-2).

There are steephead systems that occur on Piney and Mullet Creeks to the east of Test Area D-51. The pristine Piney Creek steephead and its watershed were excluded from the original RTC boundary because of the anticipated sensitivity of the landform disturbance and presence of the state-listed endangered Alabama spiny-pod. There is a beaver dam on Piney Creek, which has created a swamp lake within the steephead system (Figure 3-2). Another beaver dam exists on Eagle Creek.

Mullet and Piney Creeks developed in Citronelle geologic formation materials, and Little Trout and Eagle Creeks developed in undifferentiated coastal deposits. The predominant feature of each formation is the presence of unconsolidated to poorly consolidated, highly permeable sands. As a result, surface water generally infiltrates rapidly into the soil and moves along groundwater gradients to stream channel outflows. Over geologic time, the action of groundwater erosion has created stream systems that are deeply incised and exhibit relatively steep stream slopes.

No field investigations of these streams and water bodies were preformed. Water-quality data for these aquatic systems were not available.

LZ East Stream Systems

In contrast to the streams at D-51 South, the stream systems of LZ East have a high drainage density and increased sinuosity. The SA is in direct hydraulic contact with the stream systems of LZ East and streamflow remains fairly constant throughout the year. The stream systems within the realm of influence of LZ East include the southern flowing perennial Buck Branch and Alaqua Creek (Figure 3-3). These creeks have moderate sinuosity and are primarily feed by groundwater seepage flow and surface runoff. The Miocene Alum Bluff geologic formation outcrops at Alaqua Creek. This formation is composed of low-permeability quartz sand, clay, and shell beds. The Alaqua Creek exposure occurred as a consequence of the removal of overlying Citronelle sands and gravels (Appendix B). A steephead north of the LZ East landing strip is presently being affected by erosion from the landing strip. Water-quality data for the aquatic systems within the proposed training footprint were not available.

Base Tango Stream Systems

No streams or natural intermittent drainage systems occur at the proposed Base Tango training area.

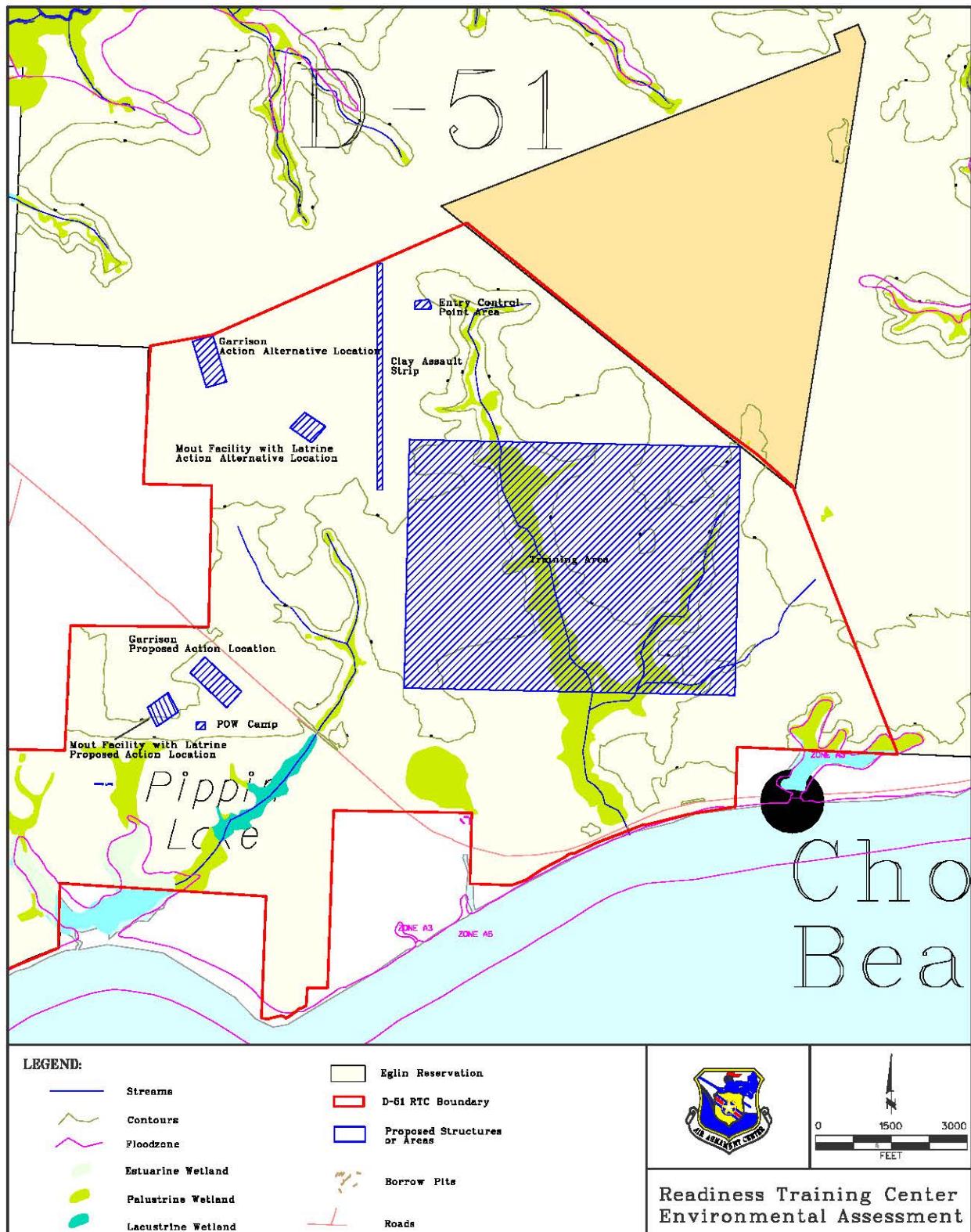


Figure 3-2. D-51 South RTC Surface Hydrology

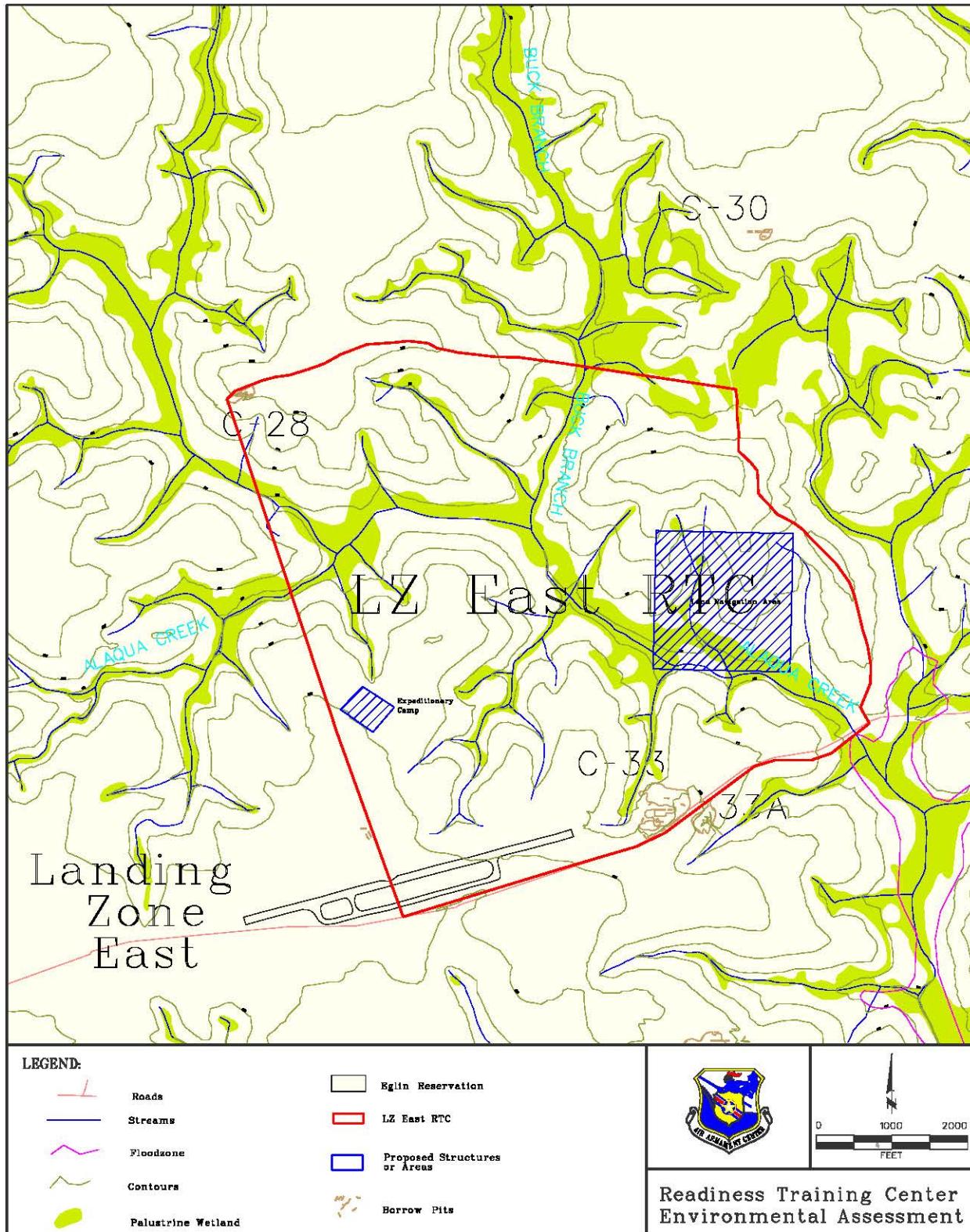


Figure 3-3. LZ East RTC Surface Hydrology

3.1.4 Meteorology

Climate is relevant to the proposed action because of the effects that local rainfall and wind conditions can have on soil erosion, surface runoff, and generated air emissions. Generally, Eglin experiences a mild, subtropical climate as a consequence of its latitude (30° to 31°) and the stabilizing effects of the Gulf of Mexico and inland bays. The climate is characterized by warm, humid summers and mild winters, prevailing southerly winds, and intense thunderstorm events and hurricane cycles (U.S. Air Force, 1995). The Gulf of Mexico and Choctawhatchee Bay, numerous marshes, and swamps add moisture to the air and moderate winter and summer temperatures (Wolfe et al., 1988). Overall, the Choctawhatchee Bay and the Gulf of Mexico moderate the climate of Eglin AFB by tempering the cold northern winds of winter and causing cool sea breezes during the daytime in the summer.

Temperature and Rainfall

The mean annual temperature at Eglin is 68°F with temperatures equal to or below 32°F on an average of 18 days and equal or above 90°F on an average of 50 days. The mean annual precipitation is 62 inches. Thunderstorms occur on an average of 80 days, and measurable amounts of precipitation occur on an average of 106 days. Mean annual wind speed is 5 knots, and the prevailing surface wind directions are northerly with calm winds occurring 19 percent of the time (Brano, 1994).

Annual rainfall averages approximately 62 inches, occurring primarily in the summer and late winter or early spring. The two peak rainfall periods are the primary period of June through August and the secondary period of February through April. Historically, the heaviest rainfall occurs during July at an average of 8.0 inches, and the lowest occurs in October at an average of 3.5 inches. Most of the summer rainfall is from scattered showers and thundershowers that are often heavy and last only one or two hours. Although the area experiences large amounts of rainfall, extensive droughts occur (Wolfe et al., 1988). A monthly weather summary is presented in Table 3-1.

Eglin AFB is vulnerable to tropical storms that originate off of North Africa and the Caribbean Sea. The Atlantic hurricane season runs from 1 June through 30 November. In the Eglin area, the most likely months are August through October. Historically, this area experiences gale-force winds an average of once every three years and hurricane-force winds an average of once every six years. Weather associated with hurricanes includes tornadoes, high winds, and extremely heavy rain.

Table 3-1. Monthly Summary of Eglin AFB Baseline Climatic Data

Month	Temperature (Mean °F)	Precipitation (Mean Inches)	Comments
January	51	4.2	Coldest month; polar fronts passed on average every 4 to 5 days; severe thunderstorms rare.
February	54	4.5	Similar to January.
March	60	6.0	Transitional warming and rainfall trend between winter and spring particularly toward the end of the month; squall lines ahead of polar fronts produce severe afternoon thunderstorms.
April	67	4.5	Warmer temperatures and general decrease in frontal passage precipitation; Crestview line showers active as sea breeze fronts push inland.
May	74	3.6	Normally the driest spring month; beginning of long warm to hot, humid season; Crestview line showers active as sea breeze fronts push inland.
June	80	5.4	Warm and humid; scattered afternoon thunderstorms; beginning of tropical storm and hurricane season.
July	82	8.0	Wettest month; intermittent scattered thunderstorms as southern maritime sea breezes move inland
August	82	6.9	Warm, wet, and humid; intermittent scattered thunderstorms as southern maritime sea breezes move inland.
September	78	6.6	Transition between hot, humid summer and fall; sea breeze related precipitation gives way to frontal passage storms; increase in tropical storm and hurricane potential.
October	69	3.5	Driest month; cooler with occasional weak frontal system storms; decline in tropical storm and hurricane potentials.
November	60	3.8	Cooler, drier air; weak frontal passage storms; end of tropical storm and hurricane season.
December	54	4.6	Polar fronts pass on average of every 4 to 5 days with associated moderate rainfall; severe thunderstorms rare.

Source: Brano, 1994

Winds

Prevailing winds are usually from the south in summer and the north in winter. Warm westerly winds originate from the Gulf of Mexico during the summer, providing cooling onshore breezes along the coast. The Gulf of Mexico moderates extremes in winter temperatures by providing heat in the winter. Winds from the northwest bring frontal systems of low precipitation and long duration in the winter. The lowest average velocity winds occur in August, and the windiest month is March.

Measurements of wind speed from 1973 through 1997 at Eglin Main showed the annual average to be 5 knots (U.S. Air Force, 1997a).

Inversions

Almost every morning, ground-based inversions occur at Eglin and break during the morning with surface heating. When the air temperature increases with height at a rate such that the air remains very stable and little mixing of the air occurs, there is an inversion. Ground-based inversions occur due to radiative cooling at the ground. For approximately five to seven days in

the winter, the inversion does not break up due to a deep layer of sea fog that slows surface heating (U.S. Air Force, 1995).

Pollutant Dispersion

The dispersion of pollutants in the atmosphere is basically dictated by the amount of turbulence in the atmosphere surrounding an emission source. Wind, which is the horizontal motion of the atmosphere, is a major source of turbulence and is therefore extremely important in air pollution meteorology. The dispersion of pollutants is aided by the convective and turbulent mixing that takes place in the lower atmosphere. The maximum altitude to which effective vertical mixing occurs is called the mixing height or mixing depth and varies diurnally and from season to season. For northwest Florida, daytime atmospheric mixing heights are higher than for most of the continental United States. Average morning mixing heights for northwest Florida range from 1,650 to 3,300 feet above ground level (AGL) in the summer to 1,650 to 2,300 feet AGL in the winter. Average afternoon mixing heights are from 2,650 to 3,300 feet AGL in the winter to 4,600 to 5,250 feet AGL in the summer. The greater the height of vertical mixing, the larger the volume of atmosphere that is available to dilute the pollutant concentration. The vertical extent to which this dispersion takes place is driven by atmospheric stability. Stability is very important because the vertical motion in the atmosphere over a polluted area determines how quickly and effectively pollutants are mixed in the air and dispersed. Characteristically, during the day, air near the earth's surface is warmer than that aloft. The warm air rises and the cooler air sinks and replaces it. This causes a vertical mixing in the atmosphere that provides a large volume of air in which pollutants can disperse. This vertical mixing is referred to as "unstable atmospheric conditions." On the other hand, stable conditions usually occur when warmer air is above cooler air in the atmosphere, inhibiting vertical mixing. This situation is called an inversion and can occur near the surface or aloft. With no vertical mixing, pollutants generated from ground-level sources will remain within the inversion layer and tend to be in higher concentrations. This situation usually occurs at night or early in the morning.

Wind direction helps to locate a single source or multisource area affecting a specific location. From an air pollution perspective, low wind speeds are conducive to poor pollutant dilution and are, therefore, associated with higher ambient pollutant concentrations. During stable atmospheric conditions, the wind is often light or calm. When stable conditions persist, the natural ambient conditions that effectively disperse pollutants are suppressed and ambient pollutant concentrations are higher near sources or source areas.

3.2 BIOLOGICAL RESOURCES

This section describes the plant and wildlife resources that comprise the biological component of the analysis. Emphasis is placed on identifying sensitive habitats and species that are within federal and/or state mandates or are of special concern.

3.2.1 Plant Communities

The plant communities that occur on the proposed training areas comprise a diverse array of upland and wetland habitats that support a variety of plants and animals. Alterations in the natural vegetative landscape have occurred as a result of timber production and harvesting,

which has reduced the overall extent of wetland communities. Another significant deviation from the natural course has been the reduction in frequency of fires, necessary to maintain the health of some habitats. The dominant plant communities now occurring on the proposed training areas are presented in Table 3-2 and discussed in the following narrative.

Additional information on the plant communities identified in Table 3-2 is presented in Appendix C. FNAI plant communities and rare plant species are shown in Figures 3-4 and 3-5.

Table 3-2. Plant Community Summary

Plant Community	Community Occurrence			Tier I Community Occurrence		
	D-51 South	LZ East	Base Tango	D-51 South	LZ East	Base Tango
Upland Communities						
Upland Pine Sandhills						
Longleaf Pine Sandhill		✓	✓		✓	
Sand Pine Sandhill	✓					
Mesic Flatwoods	✓					
Upland Mixed Forest						
Longleaf Pine/Hardwoods		✓			✓	
Sand Pine/Hardwoods	✓					
Upland Hardwood Forest		✓		✓		
Xeric Hardwoods	✓			✓		
Scrub	✓			✓		
Wetland Communities						
Baygalls	✓	✓				
Seepage Slope		✓			✓	
Swamp Lake	✓					
Depression Marsh	✓				✓	
Floodplain/Bottomland Complex	✓	✓				
Silviculture						
Pine Production	✓	✓		NA		

✓=Documented to occur

Blank = No known occurrence

NA = Not applicable

The Florida Natural Areas Inventory (FNAI) has surveyed Eglin AFB for occurrences of rare plants and important assemblages of plant communities. The FNAI is part of Florida State University's Institute for Science and Public Affairs, through the Florida Resources and Environmental Analysis Center. The mission of FNAI is to collect, interpret, and disseminate ecological information critical to the conservation of Florida's biological diversity. FNAI maintains a state-wide database on the distribution, status, and management of exemplary natural communities; endangered and rare plants and animal taxa; and managed areas in Florida. FNAI classifies land areas into the following four-tiered classification system (FNAI, 1997):

- **Tier I:** Vegetative communities that are in, or closely approximate to, their natural state and undisturbed condition. The goal of management is to maintain the natural community. FNAI recommends these areas be managed to maintain this natural state.

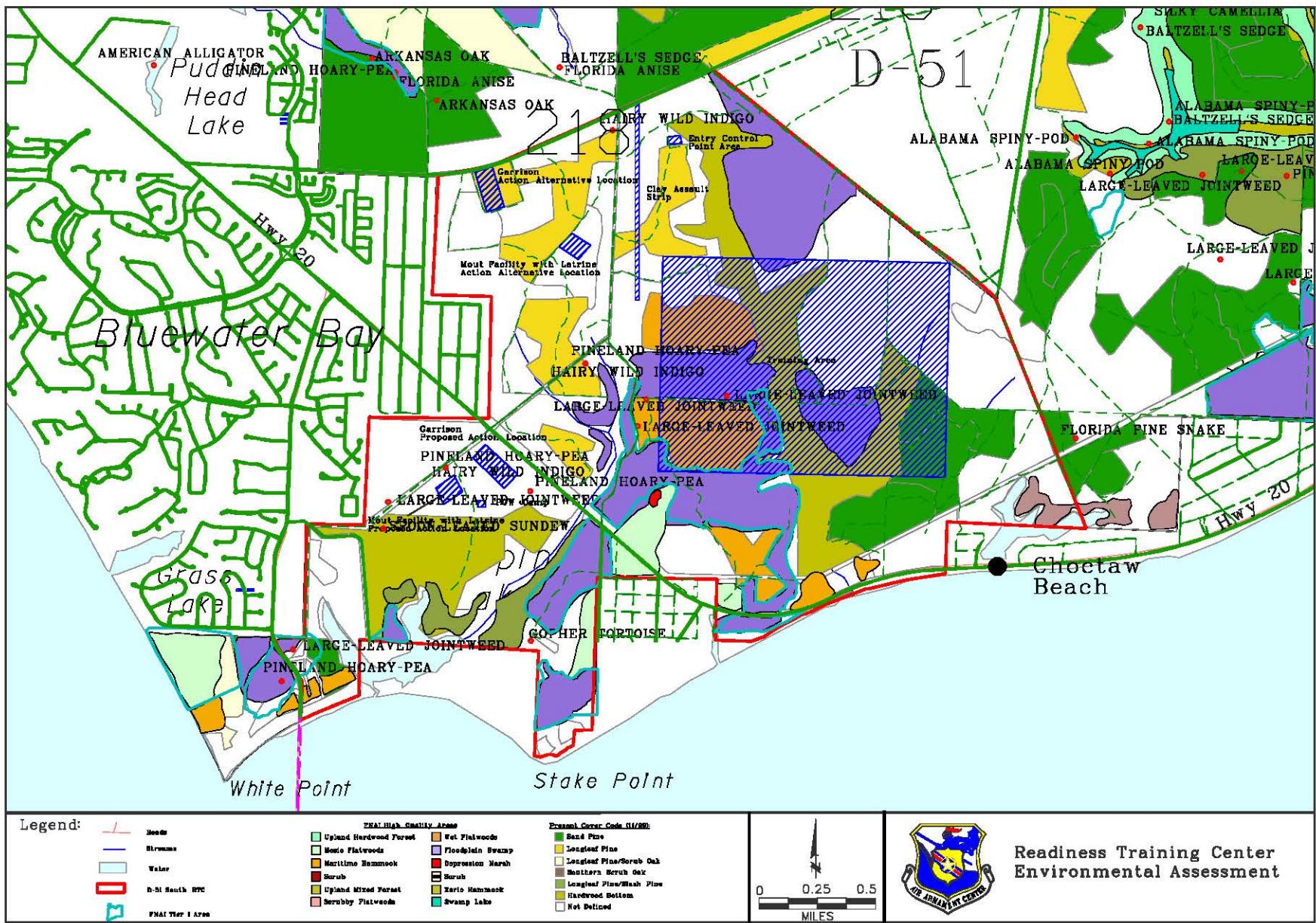


Figure 3-4. D-51 South Plant Communities

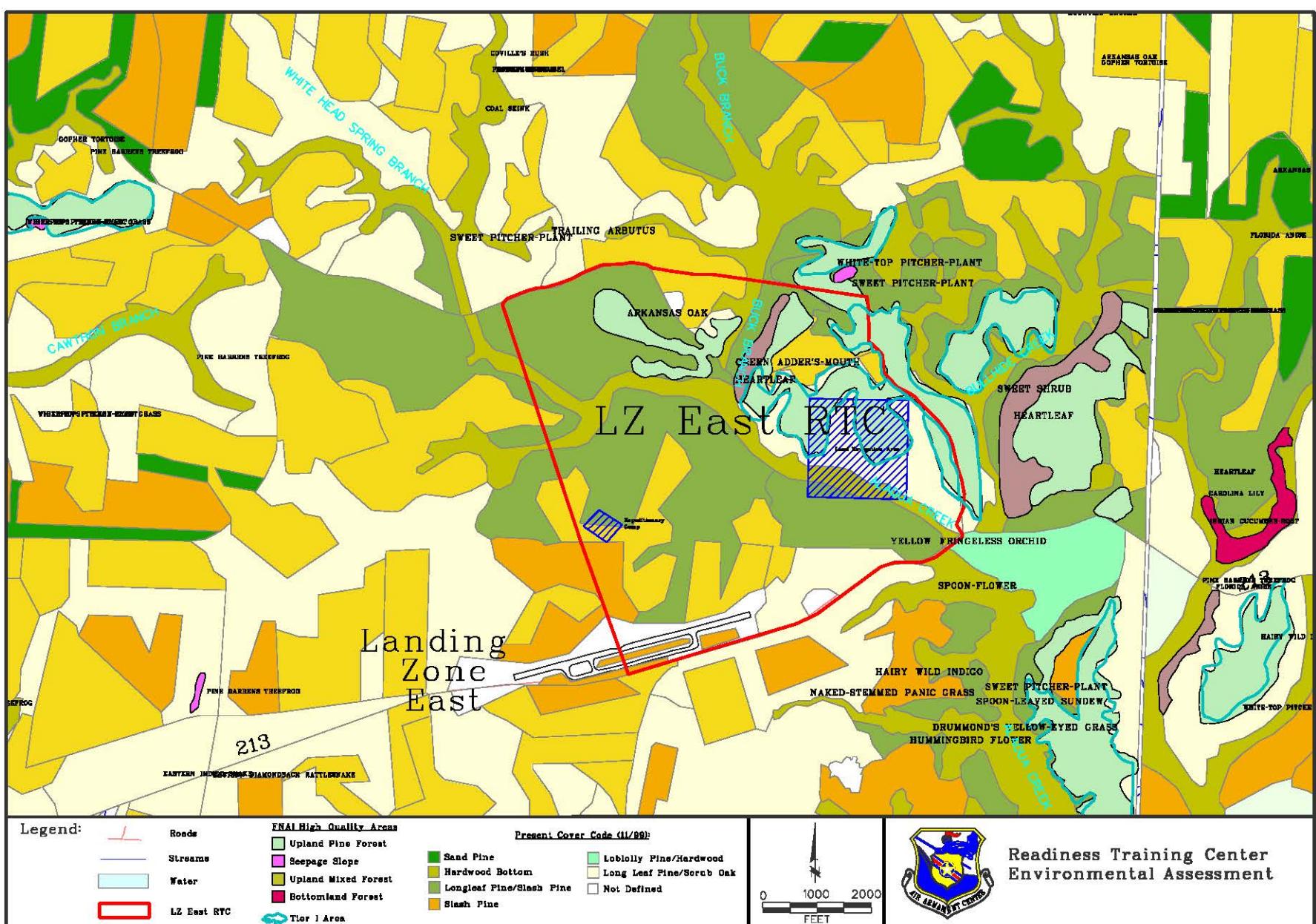


Figure 3-5. LZ East Plant Communities

- **Tier II:** Vegetative communities that retain a good representation and distribution of associated species typical of the undisturbed state but have been exposed to moderate amounts and intensities of disruptive events. Through careful management, the community may be restored or maintained.
- **Tier III:** Vegetative communities that do not retain good representation and distribution of associated species and have been exposed to severe amounts and intensities of disruptive events. Significant and intensive management over extended periods would be required to restore these communities (e.g., pine plantations).
- **Tier IV:** Areas on Eglin that have a designated land use, such as TAs, developed areas, sewage disposal areas, roads, power line rights-of-way, and other uses. The nature of the designated use determines the management goal.

An FNAI survey was conducted at Eglin AFB from 1992 through 1994 for populations of federally listed endangered, threatened, and candidate plant species, state-listed endangered and threatened plant species, and other rare plant species (Chafin and Schotz, 1995). As a result of this survey, some areas on Eglin are considered to be significant botanical sites due to their value as habitat for rare plant species or because of the high quality or rarity of their natural vegetative communities on Eglin. Special protection at these sites is required because of a high density of federal- and state- protected plant species and uniqueness of habitat that supports sensitive animals as well as plants. Habitat that supports federally-listed species must be conserved in accordance with the Endangered Species Act.

Base Tango

No designated sensitive habitats are known to occur within or in proximity to the proposed Base Tango RTC area.

3.2.2 Sensitive Plants

Sensitive species include those with federal endangered or threatened status, federal candidate species, and state endangered, threatened, and species of special concern status (U.S. Air Force, 1995). An endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is any species that is likely to become endangered within the future throughout all or a significant portion of its range due to loss of habitat, anthropogenic effects, or other causes. Federal candidate species and state species of concern are those that should be given consideration during planning of projects, but have no protection under the Endangered Species Act. No federally listed threatened or endangered plant species are within the region of influence of the proposed action; however, several state listed species have been documented to occur or may potentially occur at the proposed and alternative sites (Table 3-3).

State-Listed Species Consultations

Special incidental take permits and relocation permits may be granted from the Florida Fish and Wildlife Conservation Commission (FFWCC) for state listed species only if the “taking” does not prove detrimental to the survival potential of the species. The accidental killing of a species

of special concern should be documented and reported to FFWCC. The killing or wounding of an endangered species is punishable as a second-degree misdemeanor under State of Florida Laws and Regulations, Wildlife Code (Chapter 39, Florida Administrative Code) (Wood, 1996). However since Eglin AFB has not waived sovereign immunity, it is not required to pursue State permits or consultations with regard to state-listed sensitive species or habitats. Considerations are given to identifying if state-listed species may be affected and assessing potential impacts (U.S. Air Force, 2001d).

Alabama Spiny-Pod (*Matelea alabamensis*)

A rare plant species of particular concern is the Alabama spiny-pod. This species is state-listed as endangered and federally listed as a species of concern. The purpose of including this rare plant species in the analysis is to:

- Provide the proposed action proponent with greater planning certainty in the face of potential future listing of the species as federally endangered or threatened.
- Increase the biological value of the planning process through proactive consideration of the needs of unlisted plants.
- Document the potential for human ground disturbance associated with the proposed action to adversely affect rare plant species.

Twenty small isolated populations of the species are known to occur in a range restricted to the Gulf Coastal Plain, with the exception of one population in Wayne County, Georgia. Five populations occur on Eglin. The majority of populations occur in the ravines of streams that feed the Apalachicola/Chattahoochee River systems. Nearly 67 percent of these populations consist of fewer than 50 individuals.

The Alabama spiny-pod is a climbing, deciduous, perennial vine that is typically restricted to a narrow zone between southern deciduous forest ravine dry upper and mesic lower slopes. The species is shade-tolerant and will persist for extended periods in reduced light conditions. However, the majority of populations have low reproductive success and individual plant vigor even though the population may appear robust and productive. Light, soil moisture, and other related resources may be limiting species reproductive success. As with many rare plants, the Alabama spiny-pod allocates few resources to reproduction (Hogan, 2000).

The Piney Creek steephead adjacent to D-51 South contains one of the most stable populations of Alabama spiny-pod. Because of the rarity of the species and its potential sensitivity to disturbance, particular care must be applied to avoid trafficking the Piney Creek steephead ravine slope areas.

Table 3-3. Listed Plant Species That Occur or May Occur at the Proposed Alternative Sites

Sensitive Species	Listing Status		Natural Habitats	Occurrence		
	Federal	State		D-51 South	LZ East	BT
Wetland Habitats						
Alabama spiny-pod (<i>Matelea alabamensis</i>) Figure 3-6	SMC	E	Steephead ravines	++	+	-
Baltzell's sedge (<i>Carex baltzelli</i>) Figure 3-7	N	T	Steephead ravines, baygall, slope forest	++	+	-
Panhandle lilly (<i>Lilium iridollae</i>) Figure 3-6	SMC	E	Baygall, seepage slope, stream banks, swamp edges	+	+	-
Panhandle meadowbeauty (<i>Rhexia salicifolia</i>) Figure 3-7	SMC	T	Outer edges of depression marsh and Sandhill upland lakes	++	+	-
Primrose-flowered butterwort (<i>Pinguicula primuliflora</i>)	N	E	Wet flatwoods, seepage slopes, bog, ditches	+	+	-
Orange azalea (<i>Rhododendron austrinum</i>) Figure 3-6	N	E	Bottomlands, seepage slope, slope forest	+	+	-
Silky camellia (<i>Stewartia malacodendron</i>) Figure 3-6	N	E	Steephead ravine, baygall, slope forest	++	+	-
Sweet pitcher plant (<i>Sarracenia rubra</i>) Figure 3-7	SMC	T	Bog, baygall, bottomlands, wet prairie, wet flatwoods, seepage slope	+	+	-
White-top pitcher plant (<i>Sarracenia leucophylla</i>) Figure 3-6	SMC	E	Bog, baygall, bottomlands, wet prairie, wet flatwoods, seepage slope	+	+	-
Coastal Habitats						
Large-leaved jointweed (<i>Polygonella macrophylla</i>) Figure 3-7	SMC	T	Scrub and occasionally scrubby flatwoods and xeric hammock	++	-	+
Terrestrial Habitats						
Pineland wild indigo (<i>Baptisia calycosa</i> var <i>villosa</i>)	SMC	T	Sandhills and roadsides	++	+	+
Heartleaf (<i>Hexastylis arifolia</i>)	N	T	Slope forests, upland hardwood and mixed forests, and long the banks of seepage streams	-	++	-
Mountain laurel (<i>Kalmia latifolia</i>) Figure 3-7	N	T	Seepage streambanks	++	+	-
Green adder's-mouth (<i>Malaxis unifolia</i>)	N	E	Upland mixed forest	+	++	-
Pineland hoary-pea (<i>Tephrosia mohrii</i>) Figure 3-7	SMC	T	Open canopy Sandhills and upland pine forest	-	-	+

Table 3- 3. Listed Plant Species That Occur or May Occur at the Proposed Alternative Sites
Cont'd

Sensitive Species	Listing Status		Natural Habitats	Occurrence		
	Federal	State		D-51 South	LZ East	BT
Arkansas Oak (<i>Quercus arkansana</i>)	N	T	Upland hardwood and mixed forests and along the upper margins of steephead ravines	-	++	-
Pinesap (<i>Monotropa hypopithys</i>) Figure 3-6	N	E	Upland hardwood and mixed forests with well-drained loamy soils under a canopy of laurel oak, Arkansas oak, sand hickory, and sourwood	++	-	+

E = Endangered; T = Threatened; SMC = Species with Special Management Concerns; N = No Designated Status; “++” = Occurrence; “+” = Potential Occurrence; “-” = No known occurrence

Source: FNAI, 1997; FNAI 2002

3.2.3 Nonnative Plant Species

The introduction and establishment of invasive nonnative (exotic) plants reduce biological diversity and disrupt the integrity of high quality native ecosystems. Many exotic plants are capable of out competing native species for space, sunlight, water, and nutrients. Eglin AFB Natural Resource Branch created an Exotic Plants (EP) monitoring and control program in 1995 to identify, monitor, and control exotic species. From 1995-1997, yearly herbicidal foliar treatments have been conducted on known cogon grass sites. In 1996 and 1997, herbicide treatments were initiated on Chinese tallow trees.

Of these exotic species known to occur on Eglin, Chinese tallow tree (*Sapium sebiferum*) and cogon grass (*Imperata cylindrica*) are considered the most threatening to Eglin ecosystems. These species invade stressed and physically disturbed areas. Chinese tallow is site-competitive, thrives on well-drained upland and bottomlands, and tends to displace native plants to create monospecific tallow woodlands. Characteristic of woody invaders, it grows rapidly, begins reproduction after only three years, produces abundant viable seed, and can reproduce from cuttings. It also releases compounds that alter soil chemistry and may prevent reestablishment of native species. Cogon grass is a very aggressive rhizomatous grass that forms thick dense stands. To date there have been approximately 80 cogon grass sites documented on Eglin.

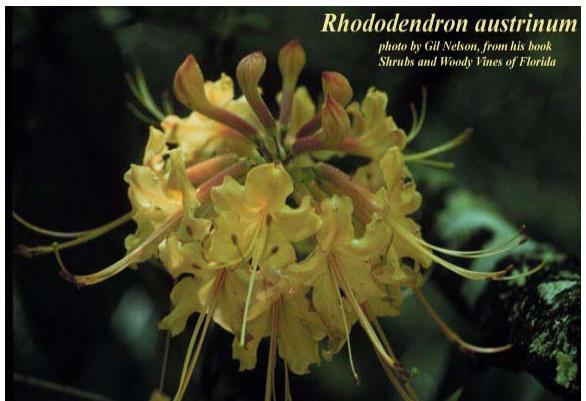
Invasive nonnative plant species can be introduced into natural areas by road construction and maintenance activities (soil introduction and movement and non-weed-free hay bales), illegal dumping of landscape debris, and movement of vehicles and equipment contaminated with invasive species seeds through an area. These invasive species can form self-sustaining stands and become established in sensitive species habitats. Without control measures, nonnative species could adversely impact sensitive species habitats.



Panhandle Lily



Alabama Spiny-Pod (FNAI)



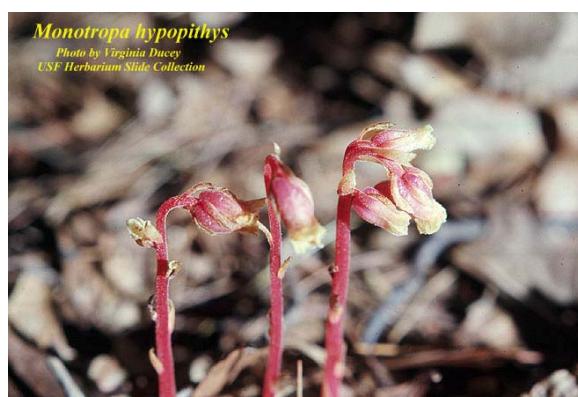
Orange Azalea



White-Top Pitcher Plant



Silky Camellia



Pinesap

Figure 3-6. Florida Listed Endangered Plants That Occur or May Occur at the Proposed Alternative Sites



Pineland Hoary-Pea (FNAI)



Baltzell's Sedge (FNAI)



Mountain Laurel (FNAI)



Panhandle Meadowbeauty



Sarracenia rubra subsp. wherryi
Photo by Fred Nation

Sweet Pitcher plant



Large-Leaved Jointgrass (FNAI)

Figure 3-7. Florida Listed Threatened Plants That Occur or May Occur at the Proposed Alternative Sites

3.2.4 Sensitive Wildlife

Training activities that may adversely impact federally protected species and candidate species for federal listing and critical habitat for protected species are subject to Sections 7 and 10 of the Endangered Species Act, prior to the irreversible or irretrievable commitment of these resources (U.S. Air Force, 1995). In 1992, Eglin, along with the U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission, entered into a cooperative agreement to manage individual species on the installation, including both federal- and state-listed species.

Eglin supports a rich diversity of game and nongame wildlife due to the variety of habitats found on the base. Eglin has managed its wildlife since 1949; the current wildlife management plan is incorporated into the *Integrated Natural Resources Management Plan* (U.S. Air Force, 2001). The Sikes Act provides a mechanism for the management of wildlife on military reservations and extends protection to migrating game birds. In 1991, the Air Force signed a Memorandum of Agreement to participate in the U.S. Fish and Wildlife Service's Federal Neotropical Migratory Bird Conservation Program, which promotes and protects neotropical birds and their habitats (U.S. Air Force, 1995). Sensitive wildlife species documented to occur or that potentially could occur on Base Tango (BT) and LZ East (Alternative Action) and D-51 South (Preferred Alternative) are presented in Table 3-4.

Table 3-4. Federal and State Listed Wildlife Species

Sensitive Species	Listing Status		Natural Habitats	Occurrence		
	State	Federal		BT	LZ East	D-51 South
Eastern indigo snake (<i>Drymarchon corais couperi</i>)	T	T	Xeric Sandhills, creek bottoms, and gopher tortoise burrows	-	+	+
Flatwoods salamander (<i>Ambystoma cingulatum</i>)	SSC	T	Inhabits fire-maintained, open-canopied, mesic pine flatwoods and reproduces in ephemeral wetlands within this community	-	+	+
Florida burrowing owl (<i>Speotyto cunicularia floridana</i>)	SSC	N	Occupies grassland burrows created by other animals	+	+	+
Florida pine snake (<i>Pituophis melanoleucus</i>)	SSC	N	Retreats to loosely packed sand tortoise burrows and stumpholes	+	+	++
Bog Frog (<i>Rana capito sevosa</i>)	SSC	N	Breeds in grassy wetlands, swamps, ponds and lakes	-	+	++
Gopher tortoise (<i>Gopherus polyphemus</i>)	SSC	N	Primarily found in longleaf pine and xerophytic oak woodlands and open grassland areas	+	+	++
Southeastern American kestral (<i>Falco sparverius paulus</i>)	T	N	Raptor that preys on animals in clearings and woodland edges	+	+	+

T=Threatened; SSC=Species of special concern; N = No designated status; “++” = Occurrence; “+” = Potential Occurrence; “-” = No known occurrence; Potential occurrence based on proximity of sighting(s) and/or habitat availability. Source: FNAI, 2002

D-51 South Wildlife

Bog frogs, pine snakes, indigo snakes, and gopher tortoise may potentially occur at D-51 South. The grassy pond associated with a beaver dam on nearby Eagle Creek is used by bog frogs as breeding habitat. A Florida pine snake and gopher tortoise have also been identified within the proposed D-51 South boundary. Indigo snakes may occur in association with gopher tortoise burrows, since the snakes use the tortoise burrows as habitat during the winter.

LZ East Wildlife

No known sensitive wildlife species have been identified at LZ East. Based on available habitat types and conditions, gopher tortoises likely occur in the area, and Florida burrowing owls, eastern indigo snakes, and Florida pine snakes could also occur within the proposed boundaries of the LZ East training area. The Florida burrowing owls frequently use abandoned gopher tortoise burrows, and eastern indigo snakes use tortoise burrows as seasonal habitat. The bottomland hardwoods that occur along Alaqua Creek could be used by black bears as feeding areas or as travel corridors. Because of their broad distribution on Eglin, southeastern American kestrels could also occur in the area.

Base Tango Wildlife

No known sensitive wildlife species have been identified as occurring on Base Tango. The longleaf pine and oak scrub areas are likely to include gopher tortoise. The absence of adjacent wetland and/or stream habitats substantially reduces the likelihood of eastern indigo snakes occurring at Base Tango. It is possible that the proximity of residential areas could increase the potential for black bears to move through the area during feeding. Southeastern American kestrels and Florida pine snakes could also use area habitats.

3.3 ANTHROPOGENICS FEATURES

This section describes Eglin's policy regarding cultural resources and identifies and describes the anthropogenic features associated with D-51 South, LZ East, and Base Tango. Specific issues under review include historic structures and archaeological resources, Installation Restoration Program sites, unexploded ordnance, and recreation.

3.3.1 Cultural Resources

Cultural resources include historic and prehistoric sites and features that represent human occupation or activity. Historic and prehistoric sites represent a primary source of information regarding the interaction of humans with the environment over the past 10,000 years. The destruction of cultural resource sites is perhaps the most significant problem facing historic preservation in the southeast. It is important to contain all forms of site destruction because such loss diminishes the fragile record of human interaction on the reservation. The loss of the physical integrity of a site associated with disturbance alters the association of artifacts with the soil strata to the point that interpretative data may be lost.

National Historic Preservation Act

The National Historic Preservation Act (NHPA) of 1966, as amended in 1980 and 1992, establishes federal policy to protect historic sites and values in cooperation with federal and local governments. Among the provisions of the NHPA are the expansion and maintenance of the National Register of Historic Places (National Register), the appointment of State Historic Preservation Officers (SHPOs), and increased consideration of tribal values. Amendments put forth in 1980 included requiring an inventory of federal resources and federal agency programs to protect historic resources. Sections 106 and 110 of NHPA primarily guide management of cultural resources lying within the jurisdiction of federal agencies. Section 106 requires that federal agencies analyze the impacts of federal activities on historic properties. Areas potentially impacted by mission activities are surveyed according to Air Force Instruction (AFI) 32-7065 in addition to requirements set forth in NHPA Sections 106 and 110. Mitigation measures are developed to minimize impacts.

Based on human occupancy tendencies of local cultures throughout time, inland prehistoric sites on Eglin often occur in proximity to water sources such as streamheads, stream slopes, and rivers. However, cultural resources not only occur on dry land but in wetlands, lakes, rivers, and offshore waters. Cultural resources that were once associated with shorelines may be significantly inland of today's shoreline.

The Cultural Resources Division of the Environmental Management Directorate, Air Armament Center (AAC/EMH) has inventoried approximately 120,000 acres of the Eglin Reservation, most of which falls within high probability areas. Of the 463,000 acres comprising the Eglin Military Complex, 120,000 acres have been surveyed, and more than 1,500 cultural sites have been identified. A total of 213,000 acres has been removed from consideration because of the low probability of finding prehistoric cultural resources. It is estimated that there are approximately 200,000 acres of high probability area on Eglin. Less the number of acres already inventoried, there are roughly 80,000 acres remaining that comprise test areas as well as interstitial lands. Surveys are conducted as part of Eglin's compliance requirements with Section 110 to inventory all of its cultural resources. As these are continuously being updated, consultation with AAC/EMH is required to obtain the latest information for any activities that would impact cultural resources.

Surveys are complete in LZ East and D-51 South RTC locations with the exception of sections that have not been accessible due to EOD concerns. Resources eligible for the NHPA have been located in both of these areas. These resources must be protected from adverse effects by means of consultation and mitigation. In addition, the expanded boundary of D-51 to the southwest includes an eligible archaeological site. Consultation with the SHPO will be necessary. LZ East and D-51 South contain significant cultural resources that may be adversely affected by impacts directly related to mission activities. EMH will provide guidance in the form of maps and will work with mission planners to minimize and mitigate these impacts.

Activities planned should be coordinated with AAC/EMH to ensure that cultural resource concerns are properly addressed. In the event of unexpected discovery of cultural resources, all activity in the immediate vicinity would cease until the Base Historic Preservation Officer was

notified and a determination of significance was rendered. Eglin's Cultural Resources Division will work to ensure that discovery does not impede the mission.

AAC/EMH is currently integrating their maps into a geographic information system (GIS) to better describe definitive cultural resource areas. More specific information is sensitive and AAC/EMH should be consulted on a need-to-know basis.

Cultural Resource Review

AAC/EMH has conducted a field survey of high probability zones associated with the proposed LZ East and D-51 South RTC locations, except for areas inaccessible due to UXO concerns. Figures 3-8 and 3-9 identify areas with cultural resource concerns that should be avoided, as well as areas yet to be surveyed. Resources eligible for the National Historic Register have been located at LZ East and D-51 South.

LZ East

Because of the high concentration of streams, LZ East also contains areas with a high probability for the occurrence of cultural resources. Known cultural resources are identified in Figure 3-8.

D-51 South

The proposed D-51 South training area location contains stream areas determined to have a high probability for the occurrence of cultural resources. Known cultural resources are identified in Figure 3-9.

Base Tango

No cultural resources are known to occur at the proposed Base Tango training area.

3.3.2 Installation Restoration Program (IRP)

Historically, human activities on Eglin have exposed the environment to potential contamination by various constituents. In some cases, unauthorized burial and dumping of potentially hazardous materials has occurred. Eglin's IRP is managed by the Environmental Restoration Division which is part of the Environmental Management Directorate. As of 25 October 2002, a total of 118 IRP and 17 compliance sites have been officially identified as requiring investigation and possible cleanup of contamination resulting from past waste disposal and mission activities.

Except for Base Tango, IRP sites are not located near proposed action sites.

D-51 South

According to the Eglin IRP Management Action Plan, which tracks the location and clean-up status of IRP sites, and Eglin GIS files, which display the locations of all such sites, no IRP sites are located within or in the proximity of the proposed D-51 South training area (U.S. Air Force, 2001).

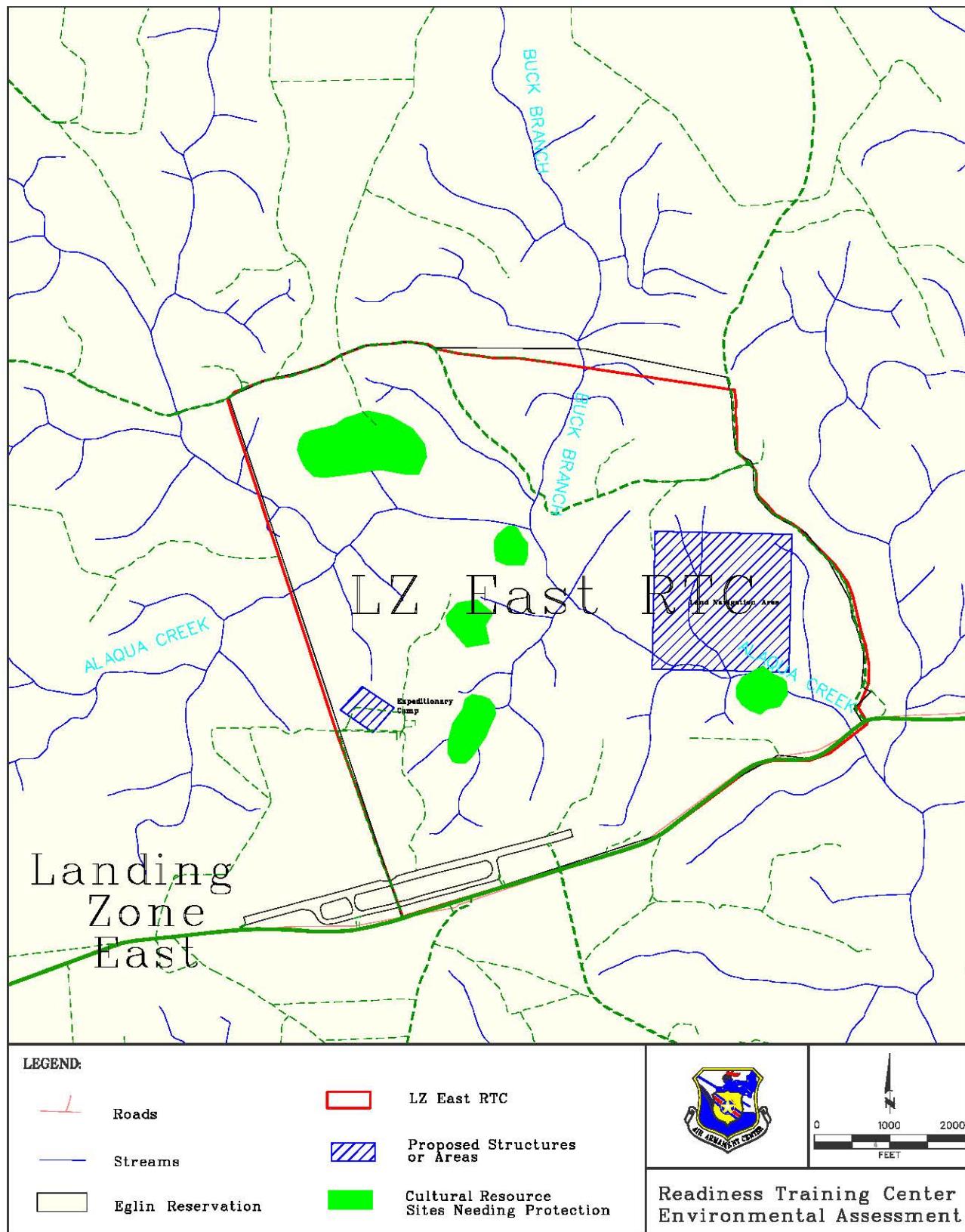


Figure 3-8. Cultural Resources at LZ East

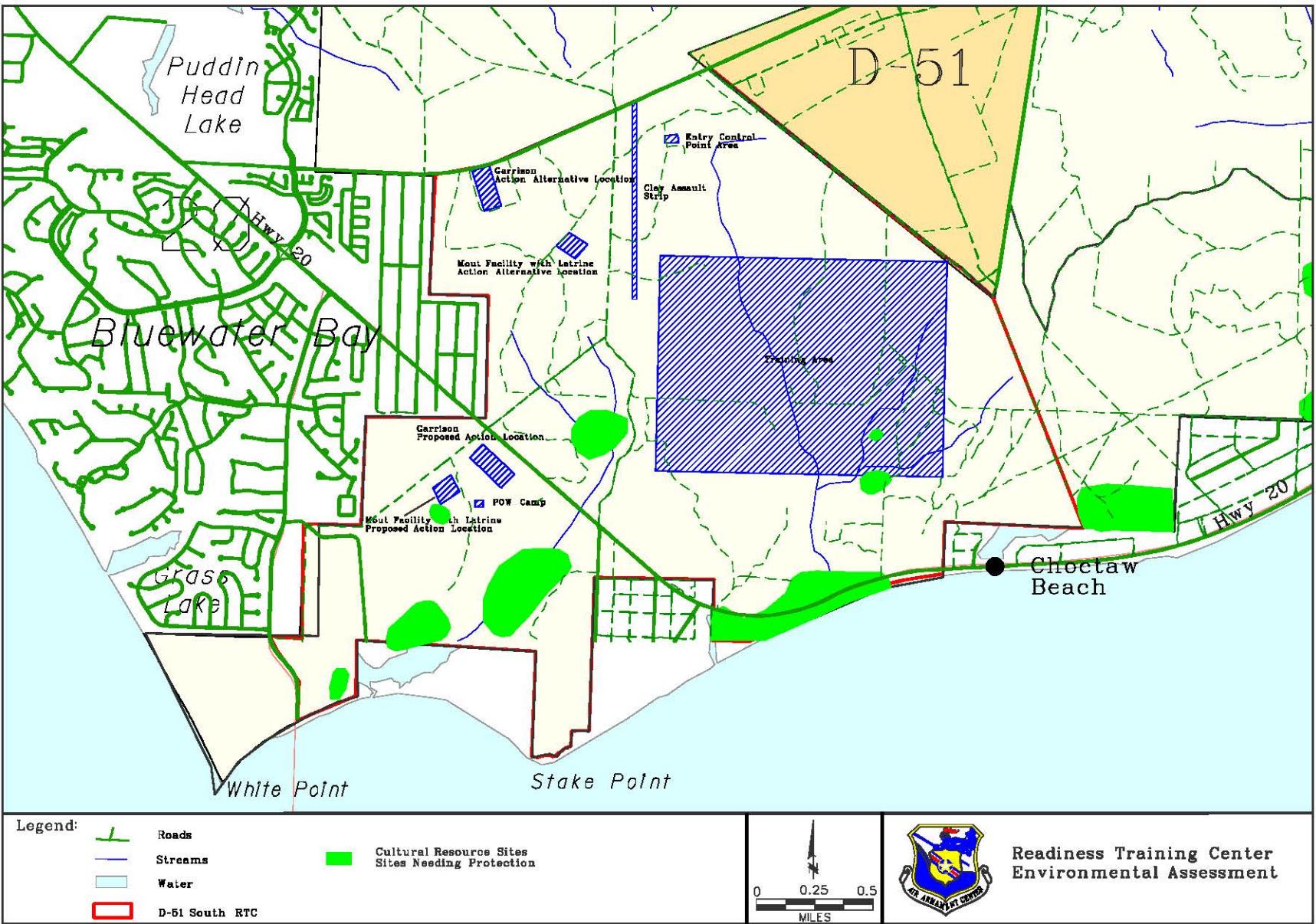


Figure 3-9. Cultural Resources at D-51 South

LZ East

No IRP sites are located within the proposed LZ East training area (U.S. Air Force, 2001).

Base Tango

IRP sites in proximity to the proposed Base Tango training site are primarily related to the petroleum storage and distribution activities that have occurred in the area. Activities at Base Tango would not affect IRP sites; thus further description of these sites is not warranted.

3.3.3 Safety (Unexploded Ordnance)

The following subsections examine the potential for UXO contamination based on historical uses at D-51 South, LZ East, and Base Tango. Figure 3-10 identifies UXO areas of concern near locations of the proposed action. Areas not labeled as contaminated or potentially contaminated with UXO may still be contaminated with as yet undiscovered UXO.

D-51 South

The areas of UXO contamination of potential consequence to D-51 South include Test Area (TA) D-51 and historical Range 57 located on TA C-52. Based on the evidence of historical expenditure of live munitions, it is assumed that these areas are likely highly contaminated with UXO materials. Since the soil texture is predominately sandy throughout the profile, it is also likely that a substantial amount of UXO materials could be at or near the soil surface (10 feet or less).

TA D-51

TA D-51 is a triangular, cleared 764-acre range located approximately eight miles east of Eglin Main. Of concern is the potential for UXO to occur within the proposed D-51 South training areas that border TA D-51. A literature review identified TA D-51 as one of the original bombing and gunnery ranges with a long history of live ordnance expenditure. It is also likely that there are historical munitions burial pits located in proximity to the test area. The area most likely to contain UXO and considered to be potentially “hot” is shown in Figure 3-10. An ordnance burial pit has been identified at the westernmost end of TA D-51.

Bombing and gunnery ranges at Eglin Field were originally cleared in 1941 and 1942. D-51, originally known as Bombing Area #2, was one of the original ranges developed in 1941. In 1945, it was used for low-level bombing, skip bombing, and ground plotting of parafrag bombs. In 1953 the capabilities of the area known as Range 51 included inert bombing, rocketry, skip bombing, and gunnery. The Explosive Ordnance Disposal School was moved to the range in 1957. From 1969 through 1987, the range was used for laser weapons systems tests, static detonation of conventional munitions in a fuel arena, and air gun launching of submunitions. Test Area D-51 is currently used by the Navy EOD School for training.

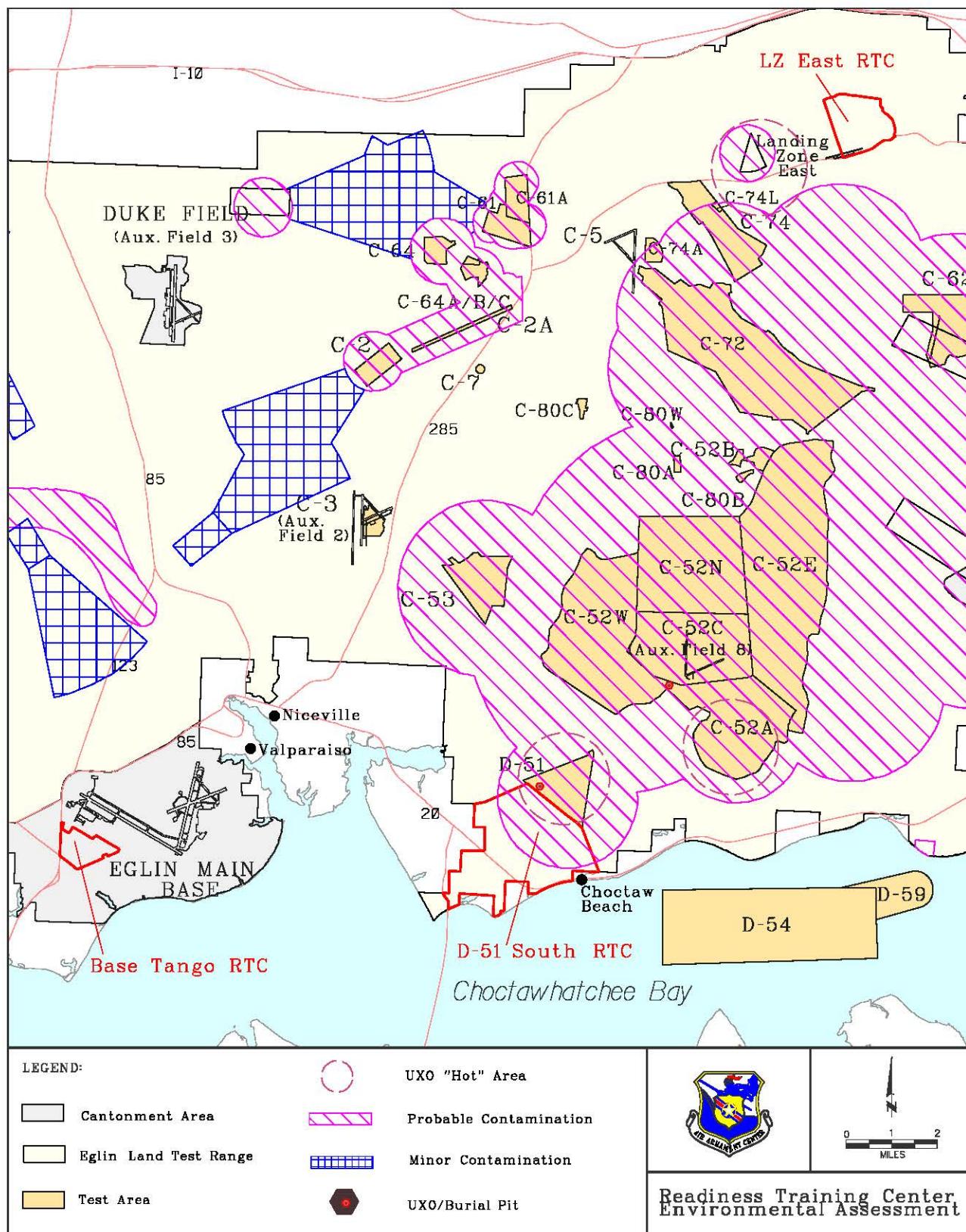


Figure 3-10. UXO Areas of Concern

Munitions weapons systems known to have been used on D-51 include high-explosive bombs, mines, rocket and missile warheads, projectiles (over five pounds net explosive weight), high explosive rocket warheads, practice bombs, projectiles (under five pounds net explosive weight), antipersonnel bomblets, mines, napalm bombs (igniter/burster hazard), and incendiaries including flares.

LZ East

LZ East is located in an area considered to have a relatively low probability of UXO. However, considering decades of use and relatively incomplete records of historical munitions expenditures, it is assumed that surface and near-surface UXO may exist within the proposed RTC training area. The nearest active test areas are TA C-74, which is 3.5 miles to the southwest, and TA C-62, approximately 3.5 miles to the south. The historical use of Range 55 may have introduced UXO in areas near the proposed LZ East training area (Figure 3-10).

Range 55 served as a pinpoint bombing and gun range during the 1940s and 1950s and is located west of TA C-74. The range was principally used for precision, inert bombing and .30 caliber, .50 caliber, and 20 mm aircraft gunnery. Previous site studies of the area found no evidence of live ammunition usage.

The outcropping and near-surface presence of Alum Bluff Group clayey materials strongly influences soil penetration resistance. The relatively high concentrations of montmorillonitic clayey material that occur in this geologic layer greatly reduce penetration resistance and increase the potential distance an item can travel through the soil compared to a predominately sandy soil. It is estimated that much of LZ East has a low resistance to soil penetration by munitions and that delivered items are more prone to penetrate the soil to a depth greater than five feet.

Base Tango

Given that there is no known history of live munitions expenditures and a soil with a sandy texture is present throughout the profile, there is a low probability of UXO in the area. Munitions that may have been expended in the area could potentially occur in near-surface locations in the soil.

3.3.4 Recreation

The Eglin reservation is a valuable source of outdoor recreation for the surrounding communities and active duty military and civilian personnel. The extensive forests are used for hunting, fishing, camping, hiking, and other activities. Approximately 280,000 acres, or 60 percent of Eglin's 464,000 acres, are currently open to the public for recreation. The Sikes Act (16 USC 670 et seq.), DoD Instruction 4715.3, and Air Force Instruction 32-7064 require that managed Air Force property be made available to the public as long as such access is compatible with military mission activities, ecosystem sustainability, and with other considerations such as security, safety, and fiscal soundness. Categories of recreation include:

- Class I – Areas (general outdoor recreation areas) suitable for intensive recreational activities such as camping, winter sports, and water sports.
- Class II – Areas (natural environmental areas) that can support dispersed recreational activities such as hunting, fishing, birding, hiking, sightseeing, jogging, climbing, and riding. Class II activities represent the major recreational land use.
- Class III – Areas (special interest areas) that contain valuable archeological, botanical, ecological, geological, historic, zoological, scenic, or other features that require protection.

Air Force Instruction 32-7064 requires classification of Air Force managed lands into one of four categories associated with the degree of public access for all areas identified as suitable for outdoor recreation.

- Category A – Open to the general public regardless of association with the military or other DoD agencies.
- Category B – Open to DOD employees, guests, family members, and retirees only.
- Category C – Open to installation personnel and guests, permanent change of station or temporary duty personnel, and their family members only. This category does not include retirees or DoD employees from other installations or military services not on permanent change of station or official temporary duty, except as guests.
- Category D – Open to installation military and civilian personnel only. This category includes only those personnel assigned permanent change of station or official travel duty at the installation. It excludes family members, guests, retirees, and other DoD employees.

The Natural Resources Branch typically sells 13,000 to 14,000 permits annually for various forms of outdoor recreation. Based on permit sales data from 20 September 1999 to 18 September 2000, non-DoD personnel purchased approximately 75 percent of the hunting and general recreation permits, 64 percent of the fishing permits, and 72 percent of the camping permits.

D-51 South

The D-51 South area is located partially in Management Unit 13, which is open to deer dog hunting and dog hunting for small game and partially in area delineated as an outdoor recreation area, which means this area is open to all forms of outdoor recreation except hunting (U.S. Air Force, 2002). The public is allowed access to Unit 13 outside of hunting season as well. Approximately 2,700 acres of the proposed D-51 South area is within Unit 13 and 640 acres is used for outdoor recreation.

LZ East

According to the INRMP, the proposed LZ East training area is located within a restricted area and is not open for public access (U.S. Air Force, 2002).

Base Tango

The proposed Base Tango training area is included in Management Unit 15 and is authorized for limited/seasonal archery hunting by DoD-affiliated personnel and their escorted guests. The area is open for archery hunting from 17 October to 15 November.

3.3.5 Roads

Eglin AFB has an extensive network of approximately 2,700 miles of roads used by organizations for public recreation, law enforcement, natural resource management, firebreak, and military mission activities. The range road landscape is also shared with a diversity of organisms and ecosystems that are affected by transport activities. Roads dissect many ecologically sensitive habitats that support federally listed species and are vulnerable to environmental issues associated with road use and maintenance activities. In a typical month, more than 50 different organizations at Eglin AFB, as well as recreational and public users, utilize the range road system. These users drive approximately half a million miles monthly, or 8.25 million miles per year, on range roads (U.S. Air Force, 1997).

Changes in mission activities since the establishment of Eglin AFB in 1935 have resulted in dramatic increases in the extent and density of Eglin's road system. Additionally, outdoor recreation and forest operations influenced road placement. However, Eglin Natural Resources Branch Forestry has constructed no roads to access timber stands for harvesting. Typically, harvest equipment utilizes existing or abandoned roads or trails to access harvestable timber.

As land use and missions in the area changed, so did the infrastructure necessary to support these diverse activities. As new roads were established, no plans were made to close older, seldom-used roads. Due to limited resources, most of Eglin's roads were not properly maintained. A road summary for D-51 South, LZ East, and Base Tango is presented in Table 3-5.

Table 3-5. Proposed Training Area Road Summary

Road Classification	Road Segments (number)			Length (miles)		
	D-51 South	LZ East	Base Tango	D-51 South	LZ East	Base Tango
City Street	1	–	–	0.011	–	–
Major	13	–	–	3.146	–	–
Primary	26	4	–	3.509	0.654	–
Secondary	27	14	–	3.145	–	–
Tertiary	37	24	–	4.514	2.220	–
Unclassified	227	–	–	40.638	2.735	–
Cantonment Area Road	–	–	3	–	–	0.326
Total	331	42	3	54.963	5.609	0.326

Some roads near D-51 South and LZ East that depict various states of wear are illustrated in Figure 3-11.

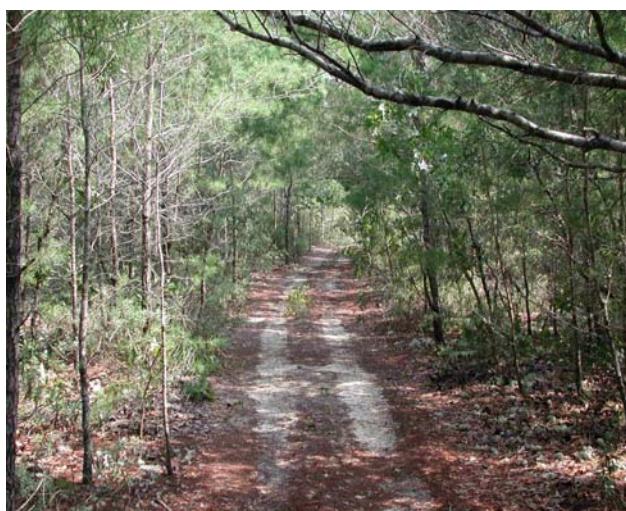


Figure 3-11. Roads within the Region of Influence

3.3.6 Air Quality

The quality of air in a given location or region is generally defined by the concentrations of various measurable substances known as “criteria pollutants.” The concentrations of these pollutants are expressed in terms of parts per million (ppm), milligrams per cubic meter (mg/m^3), or micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Air quality is determined by the type and amount of pollutants in the atmosphere, the size and topography of the air basin, and the local and regional meteorological influences.

Identifying the affected area for an air quality assessment requires knowledge of pollutant types, source emissions rates and release parameters, proximity relationships of project emission sources to other emissions sources, and local and regional meteorological conditions. For inert pollutants (those that do not participate in photochemical reactions – i.e., all pollutants other than ozone and its precursors), the affected area is generally limited to an area extending a few miles downwind from the source. Pollutant concentrations are compared to federal and state ambient air quality standards to determine potential effects. These standards represent the maximum allowable atmospheric concentration that may occur and still protect public health and welfare, with a reasonable margin of safety. The national ambient air quality standards (NAAQS) are established by EPA.

To protect public health and welfare, EPA has developed numerical concentration-based standards or NAAQS for six “criteria” pollutants (based on health related criteria) under the provisions of the Clean Air Act Amendments of 1970 (CAA). There are two kinds of NAAQS, primary and secondary standards. Primary standards prescribe the maximum permissible concentration in the ambient air to protect public health including the health of “sensitive” populations such as asthmatics, children, and the elderly. Secondary standards prescribe the maximum concentration or level of air quality required to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

NAAQS have been established for: (1) ozone, (2) nitrogen dioxide, (3) carbon monoxide, (4) sulfur oxides (sulfur dioxide), (5) lead, and (6) particulate matter with an aerodynamic diameter less than or equal to 10 microns (Table 3-6). The NAAQS are the cornerstone of the CAA. Although not directly enforceable, they are the benchmark for the establishment of emission limitations by the states for the pollutants that EPA determines may endanger public health or welfare.

Florida has adopted the NAAQS except for sulfur dioxide. EPA has set the annual and 24-hour standards for sulfur dioxide at 0.03 ppm (80 micrograms per cubic meter [$\mu\text{g}/\text{m}^3$]) and 0.14 ppm ($365 \mu\text{g}/\text{m}^3$) respectively. Florida has adopted the more stringent annual and 24-hour standards of 0.02 ppm ($60 \mu\text{g}/\text{m}^3$) and 0.01 ppm ($260 \mu\text{g}/\text{m}^3$) respectively. In addition, Florida has adopted the national secondary standard of 0.50 ppm ($1,300 \mu\text{g}/\text{m}^3$).

Table 3-6. National and Florida Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	Primary Standard ^{1,2,3}	Secondary Standard ^{1,2,4}	Florida Standards
Carbon Monoxide	8-hour	10 mg/m ³	No standard	10 mg/m ³
	1-hour	40 mg/m ³	No standard	40 mg/m ³
Lead	Quarterly	1.5 µg/m ³	1.5 µg/m ³	1.5 µg/m ³
Nitrogen Dioxide	Annual	100 µg/m ³	100 µg/m ³	100 µg/m ³
Ozone	1-hour ⁵	235 µg/m ³	235 µg/m ³	235 µg/m ³
	8-hour ⁶	157 µg/m ³	157 µg/m ³	157 µg/m ³
	Annual	50 µg/m ³	50 µg/m ³	50 µg/m ³
PM ₁₀	24-hour ⁷	150 µg/m ³	150 µg/m ³	150 µg/m ³
	Annual	50 µg/m ³	50 µg/m ³	50 µg/m ³
PM _{2.5}	Annual	15 µg/m ³	15 µg/m ³	15 µg/m ³
	24-hour ⁸	65 µg/m ³	65 µg/m ³	65 µg/m ³
Sulfur Oxides(SO _x)	Annual	80 µg/m ³	No standard	60 µg/m ³
	24-hour	365 µg/m ³	No standard	260 µg/m ³
	3-hour	No standard	1,300 µg/m ³	1,300 µg/m ³

Sources: Clean Air Act, 42 U.S.C. 7401 et seq.; Official Compilation of the Rules and Regulations of the State of Florida; Title 62 - Department of Environmental Protection, Chapter 62-272 - Air Pollution, Part III, Ambient Air Quality; MMS, 1990; U.S. Air Force, 1998.

1. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year.
2. Concentration expressed first in units in which it was promulgated.
3. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
4. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
5. The ozone 1-hour standard still applies to areas that were designated nonattainment when the ozone 8-hour standard was adopted in July 1997.
6. The ozone 8-hour standard is attained when the fourth highest 8-hour concentration in a year, averaged over three years, is equal to or less than the standard.
7. The PM10 24-hour standard is attained when 99 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.
8. The PM 2.5 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

In accordance with Executive Order (EO) 12088, Federal Compliance with Pollution Control Standards, DoD facilities must ensure that all necessary actions are taken for the prevention, control, and abatement of environmental pollution with respect to the CAA and other environmental laws. In support of EO 12088, Air Force Instruction (AFI) 32-70, Environmental Quality, requires Air Force facilities to comply with applicable federal, state, and local environmental laws and standards. Furthermore, AFI 32-7040, Air Quality Compliance, establishes a framework for Air Force facilities to follow in order to comply with applicable CAA requirements. Within this framework are the requirements to obtain and maintain operating permits as required and to prepare and periodically update a comprehensive base emissions inventory.

3.3.7 Water Quality

Water quality regulation in the United States is largely based on the maintenance and enhancement of the designated beneficial uses of water. The Clean Water Act's (CWA) overall goals and amendments are couched in terms such as "swimmable," "fishable," and "the propagation of aquatic life." The two sources of water pollution defined by CWA are point

source and nonpoint source (NPS) pollution. Point source is a discrete, identifiable discharge point, and NPS is the result of toxic and/or nontoxic substance entrance into water bodies through runoff from snowmelt, translocation by wind, and precipitation. The CWA is discussed in greater detail in Appendix A.

Choctawhatchee Bay is a state 303(d) Water Quality Listed Segment (see Appendix A) potentially influenced by the alternative action LZ East training area and preferred alternative D-51 South RTC. The LZ East avenue of potential water-quality impact is Alaqua Creek, which flows into Alaqua Bayou and into Choctawhatchee Bay. Although it is more than seven miles from LZ East to the outflow point at Alaqua Bayou, there is still the potential for soil erosion related to the performance of training activities to contribute to the overall water quality of the watershed. The D-51 South avenues of potential water-quality impacts include Piney, Eagle, and Mullet Creeks, which flow directly into Choctawhatchee Bay (Figure 3-2). This becomes a more relevant issue when considering stream morphology and flow regimes and contaminant sinks that typify most northwest Florida watersheds.

It is the relative absence of in-stream organic or clay substrates and water residence that limits the capacity of some stream channels to capture and bind waterborne constituents in stream sediments. In comparison, as water flows are reduced and passed over organic substrates and through plant biomass within wetlands, there are opportunities for a diversity of interactions that tend to remove constituents from the water column or alter their chemical form or condition.

Unless captured by aquatic flora and fauna or chemically altered by hydrolysis, photolysis, biodegradation, or other process in the water column, the majority of water constituents confined to stream channels could move relatively uninhibited from the point of entry at LZ East to the point of outfall at Alaqua Bayou and eventually into Choctawhatchee Bay. Alaqua Bayou has a shallow, sandy bottom relatively low in organic enrichment. Inversely, the deep areas of the bay are characterized by fine silt/clay sediments and relatively high levels of organic matter (Livingston, 1987).

Occupying a watershed outflow position, the deep-water sediments of the Choctawhatchee Bay also serve as a primary sink for waterborne materials and contaminants. Over time, riverine particulate matter and other materials settle out to become components of deep area sediment sinks. Sediment deposition and accumulation rates in the bay depend greatly on the rate of freshwater inflow and access to flushing from the Gulf of Mexico. Once deposited in the sediments, chemical materials may be available for uptake by benthic organisms (U.S. Environmental Protection Agency, 1999). This becomes important considering the potential links of bottom sediments to estuary biological productivity and socioeconomic vitality of the region.

The water-quality parameters of concern to Choctawhatchee Bay include biochemical oxygen demand, coliforms, nutrients, turbidity, total suspended solids, mercury, and metals. A study by Livingston (1987) identified moderately high concentrations of several metals (lead, aluminum, arsenic, cadmium, copper, iron, nickel, and zinc) in bay sediments; metal concentrations were determined to be a result of natural process and enrichment by anthropogenic activities.

Aside from current chemical materials and sediment inputs into the bay, historical ecosystem destruction and regeneration are associated with anthropogenic and natural alternations of the form and function of Choctawhatchee Bay. Prior to 1929, the bay was a large freshwater lake. To reduce flooding, a channel, now known as East Pass, was dug by local residents in Destin, connecting the bay to the Gulf of Mexico. The introduction of saline water initiated a successional change in the ecosystem of the bay with dramatic changes in aquatic plants and animals. Further reducing the potential duration of a relatively static estuary condition are reoccurring hurricanes. The millions of tons of sand potentially redistributed by a hurricane could initiate the reconstruction of a freshwater Choctawhatchee Lake, divert freshwater flows, or dramatically increase the influx of saline waters into the bay. The mixing of saline and fresh water with bottom sediments could also alter the concentration and distribution of contaminants.

Considering existing point source water-quality impacts to the bay from development and urbanization and the fragile nature of the bay ecosystem in relation to potential weather impacts, the potential roles of LZ East and D-56 South in the overall water quality on a watershed scale is not well understood. However, potential stream pathways have been identified that could facilitate hydraulic linkage between LZ East and D-51 South and Choctawhatchee Bay. Modeling and/or stream studies would be required to more clearly define processes involved and potential ramifications. There is also a historical perspective and climatic variable that weighs heavily on the existing and future conditions of the estuary that is beyond the historical and future influence of LZ East or D-51 South.

More specifically, an RTC at D-51 South could be subject to requirements of CWA if future activities become a source of Piney, Mullet, and/or Eagle Creek stream erosion and sedimentation. If extensive soil erosion and sedimentation occur on Alaqua Creek due to RTC training activities, there is a chance that the preferred alternative could be included in enforcement provision of the CWA.

Terrestrial and wetland ecosystems are instrumental in the retention and transformation of runoff suspended soil constituents. Terrestrial riparian buffers function as a first line of defense in interception and treatment of constituents. Terrestrial riparian buffers and wetlands have documented capabilities to filter, assimilate, transform, store, and cycle organic and inorganic inputs. Therefore, it is important to take into consideration the anticipated impacts to terrestrial and wetland ecosystems associated with ground training and construction activities associated with the proposed action.

3.3.8 Noise

The existing noise environment is typical of a military base with sounds such as aircraft overflights, munition detonations on nearby test areas, and vehicle traffic. Non-military noise from local highways, hunters, and other recreational users may be audible at the proposed action locations. Natural sounds include wind, rain, thunder, and wildlife.

The physical characteristics of noise, or sound, include intensity, frequency, and duration. Sound is created by acoustic energy, which produces minute pressure waves that travel through a medium like air and are sensed by the eardrum. This may be likened to the ripples in water produced when a stone is dropped into it. As the acoustic energy increases, the intensity or

amplitude of these pressure waves increase, and the ear senses louder noise. Sound intensity varies widely (from a whisper to a jet engine) and is measured on a logarithmic scale to accommodate this wide range.

Sound level is the amplitude (level) of the sound that occurs at any given time. When an aircraft flies by, the level changes continuously, starting at the ambient (background) level, increasing to a maximum as the aircraft passes closest to the receptor, and then decreasing to ambient as the aircraft flies into the distance. Sound levels are measured on a logarithmic decibel scale; a sound level that is 10 decibels (dB) higher than another will be perceived as twice as loud.

Army researchers also found that heavy weapons noise (impulsive noise) had to be measured in a different way than aircraft noise and that an aircraft flyover and blast noise of the same sound level were not equally annoying. To set the upper limit of an acceptable blast noise exposure to be comparable with the existing upper limit of an acceptable aircraft noise exposure as determined by percent annoyance of the population, the Army incorporated the recommendation of the National Research Council (1981) within Army Regulation 200-1, which defines three noise zones in terms of annual average C-weighted day-night average sound Level (L_{Cdn}) used for planning purposes when impulsive (e.g. from an explosion) noise is a concern (U.S. Army, 2001). These noise zones are based upon compatibility levels. Zones for A-weighted noise, which is used to measure small arms and transportation sound sources, were defined as well. These zones are also associated with sound averaged annually and the percent annoyance expected (Table 3-7).

Table 3-7. U.S. Army Noise and Land use Planning Guidelines

Noise Zone	Percent Population Highly Annoyed	Noise Limit Transportation and Small Arms ADNL in A-weighted dB	Noise Limit Impulsive CDNL in C-weighted dB
Land Use Planning Zone (LUPZ)	9 – 15	60 - 65	57 - 62
Zone I	<15	<65	<62
Zone II	15 – 39	65 - 75	62 - 70
Zone III	>39	>75	>70

Source: U.S. Army, 2001

3.3.9 Fire

Other than land clearing and urban development, no disturbance is more common in forests of the southern United States than fire. Fire regime refers to the long-term nature of fire in an ecosystem including frequency and severity of effects. The interval between fires may be as short as a year or as long as centuries. Fire intensity can range from benign to catastrophic.

Fire has been an integral part of the Eglin reservation pre- and post-human settlement. Historical human suppression of natural burn events has resulted in the occurrence of catastrophic “hot” burns known as wildfires. A component of longleaf ecosystem restoration on Eglin includes the

reestablishment of periodic burns that promote the establishment of preferred overstory and understory species.

Wildfires

Approximately 8,300 acres of the Eglin reservation burn from wildfire events on an annual average basis. Between 1990 and 2000, an average of 109 wildfires was reported on or near Eglin each year, burning an average of 8,300 acres annually.

Prescribed Fire

The use of prescribed fire in the management of natural ecological communities at Eglin AFB is necessary, as fire is a natural ecological force in the coastal plains of the southeastern United States. The prescribed fire program uses a variety of qualified civilian, contractor, and interagency personnel and initiates approximately 80 to 100 prescribed burns per year, averaging about 40,000 acres of area burned annually for a total prescribed fire management area of 160,000 acres.

The primary fire-adapted overstory species at Base Tango and LZ East is longleaf pine (*Pinus palustris*); sand pine (*Pinus elliottii*) is the primary fire-adapted species at D-51 South.

4. ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter analyzes the potential effects of the proposed RTC ground training and construction activities (Chapter 2) on the affected environment (Chapter 3). The environmental consequences chapter is structured in a manner that allows for the analysis of the potential effects of the proposed action on environmental parameters and provides scientific and analytic basis for comparing the Proposed Action, Action Alternative, and No-Action Alternative described in Chapter 2.

4.2 ENVIRONMENTAL EFFECTS ANALYSIS

Analysis of environmental effects begins with the identification of specific aspects of the proposed action, termed *effectors*, that would potentially affect some physical, biological or anthropogenic resource described in Chapter 3 (Affected Environment). Affected resources are termed *receptors*.

4.2.1 Potential Effectors

Effectors have been categorized according to the activities from which they originate: field training and construction. Field training components and their effectors are as follows:

- *Bivouacking* – Foot and vehicle trafficking, generation and storage of wastes, vegetation thinning
- *Patrolling* – Foot and ATV trafficking and small arms and blast simulators
- *Base Defense* – Defense position excavations and small arms and blast simulators
- *Vehicle Escorts* – Off road vehicle movements and small arms
- *Vehicle Reconnaissance* – ATV off-road movements
- *Runway Defense* – Small arms and blast simulators
- *MOUT Training* – Small arms and blast simulators

RTC construction components and associated effectors are as follows:

- *Garrison Facility* – Land clearing, ground excavations, soil mixing, creation of impervious surfaces, generation and storage of wastes
- *Expeditionary Field Camp* – Land clearing, ground excavations, creation of impervious surfaces, vehicle fuel point, generation and storage of wastes
- *Road Improvements* – Land clearing, ground excavations, creation of impervious surfaces
- *Mock Clay Airstrip* – Land clearing, ground excavations, creation of impervious surfaces
- *MOUT Village* – Land clearing, ground excavations, creation of impervious surfaces

- *PoW Camp* – Land clearing, ground excavations, creation of impervious surfaces
- *Entry Control Point* – Land clearing, ground excavations, creation of impervious surfaces

Potential impacts resulting from proposed RTC training and construction activities include:

- Changes to the physical landscape (i.e. soil disturbance)
- Noise impacts to the surrounding community
- Clearing/alteration of vegetative communities
- Alterations to hydrology (e.g. construction in a floodplain or wetland)
- Impacts to air and water quality (e.g. through sedimentation from land clearing/construction)
- Impacts to sensitive species, either directly or through changes to their habitat
- Damage to cultural resources
- Changes in access to federal lands used by the public
- Safety issues from existing UXO to military personnel using the RTC

4.2.2 Environmental Analysis Issue Categories

The potential impacts described above can be grouped for environmental analysis purposes into general categories of issues. These issues are direct physical impact, habitat alteration, chemical materials, noise, land use/restricted access and safety. In the sections that follow, the potential effects associated with the implementation of the No-Action Alternative and the Proposed Action (also the preferred alternative) and the Action Alternative are identified and analyzed by issue categories. No attempt is made to analyze the potential for a mishap with UXO. The potential simply exists and precautions would be made to avert such mishaps through UXO surveys and education of incoming trainees on how to spot, avoid, and/or report any observance of UXO.

4.3 DIRECT PHYSICAL IMPACTS

The proposed RTC field training and construction activities would potentially have direct physical impacts (DPI) on soils, sensitive species, and cultural resources from:

- Vehicle and foot traffic
- Road and facilities construction activities

As a result, such activities could potentially alter soils, surface topography and drainage patterns, cause the death or injury of sensitive animal species or their eggs, and/or sensitive plants, and disturb the integrity of cultural resource sites, causing the loss of important data.

Training activities are recurring events that would occur over a broad area, whereas construction would be a localized short-duration event with DPIS occurring primarily during initial

construction phases. It is assumed that during construction phases, the altered habitat and frequent disturbance would deter use of the area by sensitive wildlife. The creation of impervious surfaces, planting of grasses, and alteration of surface hydrology would also reduce the tendency for rare native plants that are typically less competitive in disturbed conditions to become reestablished on construction sites. A matrix of DPI potentials is provided in Table 4-1.

Table 4-1. Direct Physical Impact Potentials

RTC Mission Activity	Gopher Tortoise	Tortoise Nest Eggs	Commensal Burrow Species	Sensitive Plants	Cultural Resources
Training Activity					
Bivouacking	—	✓	✓	✓	✓
Patrolling	—	✓	✓	✓	✓
Base Defense Operations ^a	—	—	•	•	✓
Vehicle Escorts ^b	•	•	•	•	•
Vehicle Reconnaissance ^c	✓	✓	✓	✓	✓
Runway Defense	•	•	•	•	•
MOUT Training	—	—	—	—	—
Construction Activity					
Garrison Facility	•	✓	✓	✓	✓
Expeditionary Field Camp	•	✓	✓	✓	✓
New Roads/Road Improvement	•	✓	✓	✓	✓
Mock Clay Airstrip	•	✓	✓	✓	✓
MOUT Village	•	•	•	✓	✓
PoW Camp	•	•	•	•	•
Entry Control	•	•	•	•	•

✓ = Potential effect • = Minimal effect — = No known effect

^a = Defense position excavations

^b = Parking vehicle adjacent to the roadway during ambush training

^c = Off road ATV use

Potential Impacts to Sensitive Species

Gopher Tortoise

Wheeled traffic could adversely affect incubating gopher tortoise nest eggs. Even light foot traffic could have some adverse effect on eggs in a tortoise nest since the eggs are typically under a layer of uncompacted soil in the apron of the burrow (Figure 4-1). Contact with a vehicle would likely result in a 100 percent take of nest eggs, while foot pressure may only destroy a few eggs. Commensal burrow species such as the gopher frog and pine snake could also be susceptible to DPIs as a result of vehicle-caused burrow collapse. The gopher tortoise and other sensitive commensal species are discussed in detail in Appendix D.



Figure 4-1. Gopher Tortoise Burrow and Apron

Activities that involve the off-road use of vehicles and heavy equipment would be more likely to cause DPIs than individuals moving through the woods on foot. The slow and stealthy movements practiced during patrolling and foot reconnaissance reduces DPI potentials. Thus, no impacts would result from foot traffic from small groups of trainees.

Since all ammunition expenditures are blanks, there would be no danger of impact to species by projectiles. Battlefield sound simulants produce no projectile debris that would impact species.

Land clearing and construction activities, because of the level of concentrated surface disturbance, have high DPI potentials during initial phases of implementation, but total acreage cleared would be minimal at 40 acres for D-51 south and less than 10 at LZ East. Exclusionary mapping has eliminated sensitive habitats and significant botanical sites from consideration of areas where construction would occur. Once construction begins, wildlife may be inclined to leave or avoid areas of disturbance, but some species may be unable to do so either due to age (i.e. juveniles) or mobility (i.e. gopher tortoise). While not a direct physical impact, avoidance and abandonment could in some cases be viewed as indirect but potentially adverse effects since the area avoided may be preferred habitat. Stationary resources within the construction footprint, such as sensitive plants and cultural resources, would potentially be affected. Most construction DPIs could be avoided by performing a preconstruction sensitive species survey to identify, collect, and remove sensitive species.

Although the gopher tortoise is not a federal or state listed threatened or endangered species, the burrows created by tortoises have been documented as seasonal habitats for a variety of other listed species such as the federally threatened eastern indigo snake. Theoretically, reductions in the populations of gopher tortoises could reduce the availability of habitats for sensitive species. Therefore, mission activities that adversely affect tortoise populations could indirectly affect other species.

Other Species

Black bear and indigo snakes may also be potentially affected by some of the training and construction activities.

While many wildlife species avoid roads, an area with a high density of actively traveled roads increases the potential for collisions with sensitive species that may cross roads to access habitats. According to the Range Road Programmatic Environmental Assessment, most roadkills on Eglin are associated with county maintained roads where vehicles are legally allowed to drive at high rates of speed (i.e. 55 miles per hour). However, some potential still exists for collisions on unimproved roads. For example there is a documented case of a black bear mortality resulting from a collision with a vehicle on an unclassified road in the southern portion of the proposed D-51 South RTC. Additionally, most sightings of indigo snakes on Eglin have been roadkills, suggesting that the need to access habitats may override road avoidance behaviors.

Potential Impacts to Cultural Resources

Although buried and near-surface archaeological features receive some protection from DPI by overlying vegetation and soil overburden, it is possible for varying degrees of surface trafficking caused by proposed RTC training and construction activities to affect cultural resources. The movement of soil off a site could displace artifacts and corrupt the integrity of the site, resulting in a loss of archaeological data.

Resources eligible for the National Register of Historic Places have been located in the LZ East and D-51 South areas. These areas, identified in Figures 3-8 and 3-9 would be avoided and treated as “mine fields.” New cultural resource discoveries would be reported to AAC/EMH. Therefore cultural resources would not be impacted.

Potential Impacts to Physical Resources

Soil compaction and possibly alterations in terrain hydrology could result, particularly in low-lying or wetland areas. Soil compaction is the increase in soil bulk density that results from the rearrangement of soil particles in response to applied force. A limited amount of compaction of disturbed soils may be beneficial, but excessive compaction is detrimental to soil structure. Heavy equipment, vehicles, and even foot traffic can leave a long-lasting legacy of compacted soils that can have dramatic impacts on the environment. Soil compaction can reduce rainfall infiltration, slow or impede root growth, and restrict vegetation development. Compaction of natural soils usually, but not always, decreases biomass production. The soil structure and bulk density have a direct bearing on the susceptibility of soil to compaction (Appendix B).

4.3.1 Proposed Action

D-51 South

Direct physical impacts to resources would potentially occur, but the activities could be permitted and managed such that no long-term adverse effects result. Some actions would eventually have a net positive effect, such as road repair through wetlands.

A plant community identified as FNAI Tier 1 Scrub and a wetland area are present within the proposed Training Area. Approximately 100 acres of wetlands run north-south through the central portion of the D-51 South training area. Some thinning by hand of vegetation would occur within the wetland, but heavy machinery would not operate within this area except for one road that runs through a wetland (Figure 4-2 and 4-3). Road repairs to this area would occur in accordance with Eglin Road Maintenance Guidelines as well as state and federal guidelines. A Corps of Engineers Section 404 Permit and a Joint Application for Works in the Waters of Florida (i.e. Florida Dredge and Fill Permit) would be required. Road elevation and culvert installation would eventually allow reestablishment of wetland vegetation along the edge of the wetland area. There would be no established routes for ATVs; any given area of the D-51 South Training Area would potentially need to be accessible for reconnaissance training.



Figure 4-2. View of Road Through Wetland Area at D-51 South



Figure 4-3. Opposite View of Road Through Wetland at D-51 South

MOUT construction would directly impact five acres of Tier III sandhill. Garrison construction would directly impact approximately 10 acres of Tier III sandhill. No construction activities would occur in the Tier I area or within a wetland. However, vehicle traffic may have potential direct effects on these habitats. Gopher tortoise and other sensitive species may be directly killed or injured during construction or by training activities. A survey for gopher tortoise burrows would need to be conducted prior to construction. Previous gopher tortoise burrow surveys conducted on nearby Test Area C-52 in 1994 may provide a general idea of the burrow numbers, but a site-specific survey at the time of construction would be more reliable. Table 4-2 provides a rough estimate of the numbers of gopher tortoise that might be in the affected area, based on the information collected at Test Area C-52. A sensitive plant species, large-leaved Jointweed, occurs within the D-51 South training area and may be directly impacted by foot or vehicle traffic. This species is a federal species of management concern and a state threatened species. The proposed clay landing strip would directly affect about one acre of longleaf pine.

Road widening and upgrading to secondary standards may affect up to 10 miles of tertiary roads and unclassified sand roads at the D-51 South location though an exact amount is currently unknown. Using the Eglin GIS, road lengths were measured along logical transport paths to and from proposed RTC structures and training areas at D-51 South. To achieve secondary clay road standards for width, existing tertiary and unclassified sand roads would need to be widened a minimum of 20 feet in some cases and possibly more to achieve a road width of 70 feet. The total minimum cleared from road widening would be 24 acres at D-51 South.

Table 4-2. Area Potentially Affected by DPI at D-51 South

	D-51 South Training Area (some thinning, ATV)	MOUT (clearing)	Garrison (clearing)	Landing Strip (clearing)	Road Widening (Clearing)
Acres Potentially Affected	728	5	10	1	24
Estimated Number of Gopher Tortoise Within Affected Area based on .07 active burrows per acre¹	<51	<1	<1	<1	<2
Estimated Number of Gopher Frogs Associated with GT Burrows based on Assumption of 1.3 Frogs per Active Burrow²	<66	<1	<1	<1	<2

Wetland areas excluded since they would be avoided by vehicles

¹ U.S. Air Force, 1998 (Test Area C-52 PEA)

² Franz, 1984. Franz studied the association of commensal species in gopher tortoise burrows. 100 individual gopher frogs were collected from 72 burrows over a 16-month period at a north Florida location (not Eglin) for an average of 1.3 frogs per burrow. Eglin's population of gopher frogs may differ in relationship to burrows

ATVs would logically try to avoid gopher tortoise burrows. Prior to construction activities, sites should be visually cleared of gopher tortoise burrows. Discoveries of burrows or gopher tortoise should be reported to Eglin Natural Resources for possible relocation. Thinning of the training area may reveal the location of some gopher tortoise burrows, which may be present according to estimates. No impacts to burrows or sensitive species are anticipated from thinning, but marking the locations for easy avoidance is recommended. The Florida Fish and Wildlife Conservation Commission recommends a 25-foot avoidance buffer zone for land development in areas where gopher tortoise burrows occur.

LZ East

Direct physical impacts at LZ East would be not be significant.

Land clearing and construction of the Expeditionary Field Camp at LZ East would be limited because of existing concrete pads and absence of mature woody vegetation, which would also limit the potential for DPIs.

Overall direct physical impacts would primarily consist of the potential for vehicle traffic to collapse gopher tortoise burrows during times when vehicle convoys pull off onto the shoulder of the road. Sensitive plant species have not been identified in any of the areas designated for construction or road widening. Sixteen acres of a wetland area are located within the proposed Land Navigation Training Area, where only foot traffic would occur. The activities proposed for this area are by nature minimally impactive. Vehicle traffic would not occur in this area except on established roads. A permit would not be required for foot traffic activities within the wetland. If known, the general area of sensitive plant occurrence within the Land Navigation Training Area could be marked for avoidance. Table 4-3 lists potential DPI effects at LZ East.

Table 4-3. Area Potentially Affected by DPI at LZ East

	LZ East Land Navigation Training Area (foot traffic)	PoW Camp (clearing)	Entry Control Point (clearing)	MOUT (clearing)	Road Widening (clearing)
Acres Potentially Affected	76	1	1	1	5
Estimated Number of Gopher Tortoise Within Affected Area based on .07 active burrows per acre¹	<6	<1	<1	<1	<1
Estimated Number of Gopher Frogs Associated with GT Burrows based on Assumption of 1.3 Frogs per Active Burrow²	<7	<1	<1	<1	<1

Wetland areas included

¹ U.S. Air Force, 1998 (Test Area C-52 PEA)

² Franz, 1984. Franz studied the association of commensal species in gopher tortoise burrows. 100 individual gopher frogs were collected from 72 burrows over a 16-month period at a north Florida location (not Eglin) for an average of 1.3 frogs per burrow. Eglin's population of gopher frogs may differ in relationship to burrows.

An estimated two miles of tertiary and unclassified roads would require upgrading to secondary standards. A minimum of about five acres would be cleared during road widening.

Base Tango

Direct physical impacts at Base Tango would be not be significant.

Land clearing and construction would be limited because of the absence of mature woody vegetation, which would also limit the potential for DPIs.

4.3.2 Action Alternative

At the D-51 South Garrison and MOUT alternative locations, construction would directly affect approximately 10 acres of longleaf pine and five acres of scrub oak. Potential impacts associated with the Training Area, landing strip and entry control point would not change under the Action Alternative since these locations do not differ from the Proposed Action.

4.3.3 No Action Alternative

This alternative would not result in the establishment of an AFMC RTC on Eglin AFB. AFMC would continue to be dependent on Air Combat Command (ACC) and Air Mobility Command (AMC) to provide SF ground combat training. No DPIs are associated with this alternative since no action would be taken.

4.4 CHEMICAL MATERIALS

Chemical materials are essentially pollutants produced by the proposed RTC activities that may affect the quality of the physical environment or have some toxic effect on people, plants or animals. The analysis in this section considers gas and particulate matter air emissions generated by ordnance expenditures, construction, land clearing, and waste generated during bivouacs.

Air Quality

Ordnance Air Emissions

Ordnance air emissions would not have a significant impact on air quality. For the purpose of this analysis, potential air quality impacts for Proposed Action patrols, ground defense positions, and vehicle escort ordnance expenditures are evaluated collectively. The air emissions generated by the expenditure of ordnance would be the same for the alternative action. The methodology selected to evaluate the potential impacts of the proposed action on air quality includes:

- Establish a worst-case scenario for small arms firing that represents a peak criteria pollutant exposure potential.
- Create a simulated enclosure that represents the volume of space where exposures to peak emission concentrations are likely to occur.
- Identify a timeframe during which peak concentrations could persist within the simulated enclosure.
- Calculate an estimated peak exposure concentration for the enclosure/timeframe scenario.

The threshold criteria selected for comparative analysis is the National and Florida Ambient Air Quality Standards (NAAQS) (Section 3.4.6). For this analysis, the simultaneous automatic firing of an M-16 and M-60 from a ground defense position was selected as the ordnance expenditure scenario that would likely result in the highest concentration of air emissions. The parameters of the scenarios are as follows:

- Fifty rounds of 5.56 mm ammunition and 50 rounds of 7.62 mm ammunition are fired on automatic in a single burst.
- The PETN propellant of each round contains 0.0005 pounds of lead in the form of lead styphnate, lead azide, and/or lead salicylate per pound of propellant.
- The peak air emission concentrations occur within a sphere 10 feet in diameter over the firing position that has a volume of 15 cubic meters.
- Unfavorable weather conditions of calm winds (less than four miles per hour) and a 300-foot inversion extend for the duration of the small arms firing event.
- The longest duration of peak concentration within the enclosure is five minutes.

The estimated by-products and potential air emission exposure concentration for the scenario are presented in Table 4-4.

Table 4-4. Estimated Peak Concentration of Air Emissions Generated by the Combined Firing of an M-16 and M-60 from a Ground Defense Position

Criteria Pollutant	Emission Factor (lb/lb)	M-16 and M-60 Total Emission By-product		NAAQS Standards
		Total Emission (grams)	Exposure Sphere Peak Concentration	
Carbon monoxide (CO)	0.3940	11.20	0.75 mg/m ³	40.0 mg/m ³
Nitrogen dioxide (NO ₂)	0.1780	3.76	1.0 µg/m ³	100.0 µg/m ³
Lead (Pb)	0.0005	0.0003	0.00002 µg/m ³	1.5 µg/m ³
Particulate Matter (PM ₁₀)	0.2300	0.037	0.0025µg/m ³	50.0 µg/m ³

Once pollutants are air-borne, the process of atmospheric mixing, dilution, and dispersion can quickly alter the extent and duration of pollutant peak concentrations. The ground cloud generated by small arms firing, which is warmer than the surrounding air due to the heat of combustion, will initially rise and drift as it cools. It would eventually reach a stabilization altitude, cool to the point where it would no longer rise, and continue to disperse as it drifts. Part of the cloud would eventually reach the ground and ultimately disperse to the point of having no measurable impact on ambient air quality.

Based on the small arms firing scenario, the estimated carbon monoxide (CO), nitrogen dioxide (NO₂), lead (Pb), and particulate matter (PM₁₀) are substantially less than the NAAQS standards. It is anticipated that the dynamics of atmospheric dilution and dispersion, although somewhat limited during unfavorable weather conditions, would further dilute and disperse air pollutant within a five-minute timeframe. No potential adverse air quality impacts to humans or sensitive species are anticipated.

Construction, Road Widening and Land Clearing Air Emissions

Construction, land clearing, and road widening activities would generate both combustive emissions from heavy equipment usage and fugitive dust emissions from land clearing activities, but would not have a significant effect on air quality. Emissions would be greatest during site clearing and grading activities of approximately 50 acres (Tables 4-2 and 4-3). Previous environmental assessments on Eglin have viewed the threshold for significant air quality impacts at 10% of the Eglin total air emissions or county total air emissions. In other words, as long as the proposed action does not generate a given pollutant in amounts that equal 10% of Eglin's total annual amount or 10% of Okaloosa County's, then there is no significant air quality impact.

The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the land being worked and the level of construction activity. Uncontrolled fugitive dust emissions from ground-disturbing activities are estimated to be emitted at a rate of 110 pounds total suspended particulates (TSP) per acre per working day (acre-day) or 1.2 tons per acre per month (USEPA, 1985). In a USEPA study of air sampling data taken downwind from construction activities, PM₁₀ emissions from various open dust sources were determined based on the ratio of PM₁₀ to TSP sampling data. The average PM₁₀ to TSP ratios for top soil removal, aggregate hauling, and cut and fill operations are reported as 0.27, 0.23, and 0.22, respectively (USEPA 1988). Using 0.24 as the average ratio for purposes of analysis, the emission factor for

PM₁₀ fugitive dust emissions from ground disturbing activities becomes 26.4 lbs per acre per day of disturbance.

The USEPA also assumes that 230 working days are available per year for construction (accounting for weekends, weather, and holidays), and that only half of these working days would result in uncontrolled fugitive dust emissions at the emitted rate described above. Additionally, four acre-days of disturbance are assumed per acre.

Construction, land clearing and road widening activities at D-51 South and LZ East would affect approximately 50 acres (Tables 4-2 and 4-3). For the sake of analysis, a completion time of two years for all ground disturbance activities was assumed. Assuming the rate of disturbance does not change, an average of 25 acres per year would be disturbed. The analysis of fugitive dust emission from construction activities assumes an average of 230 working days per year (accounting for weekends, weather, and holidays), and that half of these days (115) would be used for site preparation. Additionally, four acre-days of disturbance are assumed per acre. Thus, for the proposed action, the PM₁₀ emissions are calculated as follows:

Average daily disturbed acreage:

$$\frac{25 \text{ acres disturbed}}{\text{year}} \times \frac{4 \text{ acre-days}}{\text{acre}} \times \frac{1 \text{ year}}{115 \text{ days}} = 0.87 \text{ acres}$$

Average daily PM₁₀ emissions:

$$0.87 \text{ acres} \times \frac{26.4 \text{ pounds PM}_{10}}{\text{acre-day}} = \frac{23 \text{ pounds PM}_{10}}{\text{day}}$$

Total annual PM₁₀ emissions:

$$\frac{23 \text{ pounds PM}_{10}}{\text{day}} \times \frac{115 \text{ days}}{\text{year}} \times \frac{\text{ton}}{2,000 \text{ pounds}} = \frac{1.3 \text{ tons/year}}{= 2.6 \text{ tons/two-year period}}$$

Therefore, the amount of PM₁₀ emitted would be 23 pounds/day or 2.6 tons over the two-year period. These emissions would produce elevated short-term PM₁₀ concentration, would be temporary, and would fall off rapidly with distance from the source. PM₁₀ emissions from RTC construction and land clearing would not exceed 10 percent of Eglin or Okaloosa County total emission levels (Table 4-5).

Table 4-5. Fugitive Dust Emissions for RTC Construction and Land Clearing (tons/year)

Pollutant Emission Source	PM ₁₀
RTC Construction and Land Clearing	1.3
Okaloosa County Total Emissions	5,659.00
Eglin AFB Total Emissions (CY98)	104.5
Percent Change Okaloosa County	0.02%
Percent Change From Eglin AFB	1.2%

Source: USEPA CEIS web site, no date; U.S. Air Force, 2000

Water Quality

Aspects of establishing an RTC that requires consideration of potential impacts on groundwater and surface waters are sewage, kitchen, and graywater wastes produced from field training exercises. Graywater is shower and sink wash water produced from field operations. Existing Eglin AFB procedures for handling sewage and kitchen wastes would eliminate any potential effects on ground and surface waters. On Eglin, field operations are required to collect kitchen wastes and then dispose of them either through a base wastewater treatment system or an off-base wastewater system. The 96 CEG will advise coordination of this disposal. Sewage would be collected via portable latrines and transported offsite for proper disposal. There are no water quality issues associated with field shower and other wash water wastes.

4.4.1 No Action Alternative

This alternative would not result in the establishment of an AFMC RTC on Eglin AFB. AFMC would continue to be dependent on ACC and AMC to provide SF ground combat training.

4.4.2 Proposed Action (Preferred Alternative)

Analysis indicates that the Proposed Action would not significantly affect air or water quality. No exceedences of state or federal standards would occur. Portable latrines would accommodate sewage. Kitchen wastes would be collected and removed. No impacts would result from field showers.

The ground disturbance activities and construction activities at D-51 South would exceed five acres; thus a stormwater permit would be required.

4.4.3 Action Alternative

Under the Action Alternative, the level of activity would be similar to that of the Proposed Action; however, the location of MOUT and garrison facilities would change. Air quality analysis results presented in Table 4-2 indicate effects would not be significant and that no exceedences of state or federal standards would occur. No water quality impacts would occur. Sewage and kitchen wastes would be disposed of in on-base or off-base wastewater treatment systems. No impacts would result from field showers.

The ground disturbance activities and construction activities at D-51 South would exceed 5 acres; thus a stormwater permit would be required.

4.5 HABITAT ALTERATION

This section analyzes the potential for the proposed RTC mission activities to adversely impact natural habitats within the LZ East and D-51 South areas. Gopher tortoise burrows, wetlands, and high quality plant communities would potentially be affected. Alterations to the physical landscape, such as soil compaction and disturbance, may in some cases relate to or lead to other impacts including erosion. Vehicle traffic, wildfires, construction, and land clearing are the primary habitat alteration mechanisms associated with the proposed action.

4.5.1 Proposed Action

Approximately 50 acres total would be cleared as part of the proposed action (Tables 4-2 and 4-3). Tables 4-6 and 4-7 identify the type and amount of vegetative habitat, including FNAI Tier I areas that would be potentially affected by the proposed action. Eglin GIS natural resource coverages of FNAI community types were overlaid on proposed activity areas to determine potential acreage affected. Exclusionary mapping during the analysis process endeavored to locate the structures of the proposed action in minimally impactive areas. Those structures requiring land clearing, such as the MOUT and garrison, are proposed for location in Tier III areas, which are of comparatively lower quality and previously impacted from human activities.

Table 4-6. Acres of Plant Communities at D-51 South Potentially Affected by the Proposed Action

Plant Community Type	D-51 South Training Area	MOUT (clearing)	Garrison (clearing)	Landing Strip (clearing)
Maritime Hammock	142	0	0	0
Hardwood Bottom	211	0	0	0
Sand Pine	281	0	0	0
Scrub	117	0	0	0
FNAI Tier I Scrub	28	0	0	0
Longleaf Pine	0	0	0	1
Tier III Scrub	0	5	10	0

Table 4-7. Acres of Plant Communities at LZ East Potentially Affected by the Proposed Action

Plant Community Type	LZ East Land Navigation Training Area (minimal alteration)	PoW Camp (clearing)	Entry Control Point (clearing)	MOUT (clearing)
Tier I Upland Pine Forest	29	0	0	0
Longleaf Pine/Scrub Oak	27	0	0	0
Longleaf Pine/Slash Pine	4	<1	0	0
Slash Pine	0	0	<1	<1
Hardwood Bottom	16	0	0	0

Mission activities of the proposed action are discussed below with respect to the types of habitat alteration effects they may have.

Field Training Activities

Field training activities would have virtually no long-term adverse impact at LZ East within the Land Navigation Area, where primarily foot traffic would occur. Some thinning of vegetation may be required in selected areas, but in many habitat types, thinning by fire or other means can have net positive effects. Vehicles would stay on established roads but may occasionally have to pull off on the shoulder. Wetland areas would be avoided.

Bivouacking

The construction of the bivouac area would require the removal of a limited number of woody stems and brush to improve accessibility while maintaining a degree of protective cover. No soil displacement would occur. Water would be transported to the site, electricity provided by

portable generators, and port-a-lets would provide for lavatory needs. Wetlands would not be affected since these areas do not make suitable bivouac sites.

Patrolling

In general, patrolling is an environmentally benign activity and variation of routes would minimize the effects of soil compaction and vegetation damage to any given area. Still, it is recommended that in locations with known rare plants, and those designated as significant botanical sites, that disturbance to vegetation be kept to a minimum or avoided altogether where possible.

Ground Defense and Battlefield Sound Simulator Positions

The digging of the 12 ground defense and two battlefield sound simulator positions would not likely pose a potential impact to sensitive species since the construction site would be investigated before excavation and the location could be altered to avoid impacts to potential sensitive species.

Battlefield simulators are a known cause of mission-related wildfires. LZ East has a high potential for wildfires, but a minimal risk of impacts from wildfires due to a series of existing roads and streams that act as firebreaks, and the remoteness of the area.

There is a concern that prescribed fire operations would be affected by the increased activity at LZ East, as smoke management of such fires (that is keeping the smoke away from populated areas) would be made more difficult by the presence of the RTC, which would also require smoke considerations. Ultimately, the inability to effectively conduct ecosystem management could affect mission support through a lack of endangered species habitat management (U.S. Air Force, 2002).

Wildfire concerns on D-51 South would be minimal as long as existing guidelines are followed. However, if wildfire occurs during periods of high fire danger (i.e. high vegetative fuels, dry conditions), smoke combined with a north wind could significantly affect populated areas and Highway 20 (U.S. Air Force, 2002).

Vehicle Escorts

Range roads would serve as primary locations for vehicle escort training. No sensitive plants were identified to occur along these roads. Considering only two to three vehicle escort exercises would be performed during a five-day training mission once a month, it is anticipated that roadside vegetation would have sufficient time to recover from damage from vehicle wheels.

The immediate areas adjacent to the roads that would be used for moving vehicles off the road during training are unlikely locations for tortoise burrows because of road vibrations and compacted road subgrades that would probably discourage burrow excavations; therefore, no impacts to gopher tortoises or tortoise nest eggs are anticipated.

Widening of roads would affect an estimated 24 acres of mostly scrub and longleaf habitat. The existing condition of many roads within the region of influence is poor; thus, upgrading the roads

according to secondary specifications and performing the upgrades in accordance with Eglin Range Road Management Plan would help control habitat loss from erosion that is already occurring.

4.5.2 Action Alternative

Under the action alternative, a different location is proposed for the garrison and MOUT locations at the D-51 South site. Locating the garrison north of Highway 20 would impact 10 acres of longleaf pine; the alternative MOUT location would require clearing of 5 acres of sand pine. About 24 acres of longleaf pine and scrub would be cleared from road widening. Road repairs would reduce erosion impacts on surface waters and wetland areas.

4.5.3 No Action Alternative

Under this alternative no Readiness Training Center would be established. No new habitat impacts would occur. Habitat impacts from road erosion would continue unless repairs were effected.

4.6 RESTRICTED ACCESS

Restricted access to roads or outdoor recreation areas can sometimes occur when mission operation footprints overlap these areas. Operation footprints serve as a buffer to protect humans from dangerous situations and allow military training operations to be performed unencumbered. Military and non-military personnel could be temporarily inconvenienced.

4.6.1 Proposed Action

The proposed action would make some areas currently used for hunting and outdoor recreation either permanently unavailable to the public, or unavailable over a long-term period (e.g. five years). The LZ East RTC use area is comprised of lands designated as restricted, which means it is closed to all forms of public access. Since the area is already restricted, no additional impacts to the public would occur.

The D-51 South area is partially within Management Area 13, which is open to certain forms of hunting, and partially within an area designated for all forms of outdoor recreation, excluding hunting. Approximately 2,700 acres of Management Area 13 would be made unavailable to hunting or other forms of recreation. Approximately 642 acres of the D-51 South area bordering Choctawhatchee Bay would be made unavailable for outdoor recreation. Some effects to hunters and outdoor recreationists would occur, but are difficult to quantify. Only a fraction of the overall total of Eglin open lands would be affected. Other Eglin lands would be available and would have to absorb the users of the RTC lands. Thus, the effects should be minimal.

4.6.2 Action Alternative

Under the Action Alternative, restricted access issues would not change. The alternate location for the garrison and MOUT areas north of Highway 20 would not affect the dimensions of the overall D-51 South RTC area; thus there would be no change over the proposed action.

4.6.3 No Action Alternative

This alternative would not result in the establishment of an AFMC Regional Ground Combat Training Center on Eglin AFB. AFMC would continue to be dependent on ACC and AMC to provide SF ground combat training. No environmental impacts are associated with this alternative since no action would be taken.

4.7 NOISE

For the purpose of this analysis, noise is the unwanted sound produced by mission expenditures. Sound pressure levels are fluctuations in atmospheric pressure resulting from the movement of sound waves and are measured on a logarithmic scale in decibels (dB). Noise effects can be perceived as pressure, vibration, sound, or combinations of these depending on the proximity of a resource to the source of noise and type of resource potentially affected. The relationship of noise to this analysis is the potential for sound to:

- Adversely impact sensitive plant and animal species through direct physical damage (i.e. from blast pressure) or interruption of nesting, breeding, or reproduction.
- Disturb or annoy the public by the extension of noise into communities.
- Expose ground combat trainees and supervisors to unsafe noise levels.

4.7.1 Proposed Action

The battlefield sound simulator, used to simulate the realism of machine gun and artillery fire, and small arms fire are identified as the activities that could potentially result in noise impacts.

Two analysis thresholds, 140 dB and 115 dB, have been selected for impacts analysis for noise from battlefield sound simulators. The 140 dB level is the maximum safe exposure level for humans without ear protection, and 115 dB has been suggested as a noise level that causes moderate annoyance in people (Pater, 1976). The human injury threshold is based on 100 continuous 140 dB noise event exposures. Low winds and inversions, hilly terrain, and woodland vegetation generally reduce the distance noise travels, compared to high winds, no inversions, flat terrain, and minimal standing vegetation conditions.

In 1996, the Eglin AFDTC/SES investigated potential noise safety issues associated with the battlefield sound simulator. The noise threshold used during field-testing was 140 dB. Noise levels were measured at 10, 20, and 30 feet from the simulator. The noise in all cases was measured to be between 125 and 127 dB. Glass panes exposed to simulator blasts at distances of 3, 10, 20, and 30 feet did not break. Based on test results, it was concluded that hearing protection would not have to be worn in the operation of the battlefield noise simulator. However, it was recommended that hearing protection be worn by persons within 10 feet of the firing chamber (U.S. Air Force, 1996).

Based on a noise level of 127 dB at 30 feet and the general rule that for the doubling of the distance from the source the noise level decreases by 6 dB, it is estimated that noise levels would be less than 115 dB within 100 feet of the simulator. Rolling topography and dense woodland

vegetation would have a strong dampening affect of the distance the noise could travel. Forested areas of at least 100 feet in width can reduce noise levels by 3 to 7 dB (New York State Department of Environmental Protection, 2001).

For small arms fire, a threshold of 62 L_{Cdn} (day-night average of C-weighted noise) was used to estimate potential noise impacts to the public. According to studies by the U.S. Army, the 62 L_{Cdn} threshold represents the level of noise that would slightly annoy 15 percent of the public (U.S. Army, 1994).

Estimated small arms expenditures are listed in Table 4-8 below. Over a given five-day session, approximately 6,000 small caliber rounds would be expended each day at several locations within the LZ East and D-51 South areas of the RTC. The approximate distribution of daily expenditures is given in Table 4-9.

Table 4-8. Estimated RTC Small Arms Expenditures

Munition Type	No. of Trainees	No. Rounds Given to Each Trainee	Rounds Expended		
			Per Mission Day	Per Training Session	Yearly
M-16 5.56 mm Blanks	88	300	5,280	26,400	184,800
M-60 7.62 mm Blanks	10	300	600	3,000	21,000
TOTAL			5,880	29,400	205,800

Session = 5 days of Expeditionary Field Camp training following one week of classroom training; 7 sessions per year

Table 4-9. Distribution of Daily Expenditures

Munition Type	Rounds Expended Per Mission Day	At D-51 South MOUT (20%)	In Training Areas (80%)
M-16 5.56 mm Blanks	5,280	1,056	4,224
M-60 7.62 mm Blanks	600	120	480
TOTAL	5,880	1,176	4,704

The majority of the expenditures would occur in the land training areas of D-51 South and LZ East, where terrain and vegetation would have a dampening effect on noise propagation. The exact distribution of small arms fire through training areas, landing strips, and facilities is unknown; however, a reasonable assumption of 1,000 rounds for a given location was used to assess potential noise impacts.

The area in which the rounds would be expended was defined to measure 1,000 feet by 1,000 feet. For each exercise, it was assumed that approximately 1,000 rounds of varied-caliber ammunition would be expended. Sound levels associated with use of these arms at their firing location varies from approximately 142 dB to 160 dB (AFOSH 1994).

Some areas of the RTC are relatively close to residential areas and these locations were selected as potential areas of noise impacts. Noise contours, expressed as L_{Cdn} , from 1,000 rounds of various caliber small arms were overlaid onto the MOUT facility and perimeter of the D-51 South training area to visualize potential noise effects. These contours were based on outdoor firing scenarios, but in reality gunfire would be distributed both outside of and within the MOUT facility. The walls of the MOUT would dampen gunfire noise from within the MOUT, reducing the amount of noise reaching residential areas. RTC areas at the LZ East location are more than 9,000 feet from the closest residential area; thus noise from small arms at the LZ East area would not have the potential to annoy the public. The noise from the expenditures at the D-51 South MOUT facility would potentially be perceptible to the surrounding residential area of Bluewater Bay, the closest of which is approximately 1,350 feet from the MOUT facility. The southeast corner of the D-51 Training Area is approximately 1,330 feet from the nearest residential area of Choctaw Beach, also close enough for residents to hear small arms noise, though thresholds would not be exceeded. Table 4-10 provides data on sound levels resulting from a single operation in a 24-hour period and Figure 4-2 illustrates the placement of noise contours from small arms fire (based on the data in Table 4-10) at locations of the RTC closest to residential areas.

Table 4-10. Proposed Action Small Arms Noise from 1,000 Rounds

Distance From Edge of Maneuver Area (in Ft.)	Noise Levels: Single Operation [$L_{eq(24)}$] C-Weighted	
	Leading Edge	Lateral Edge
500	61.6	61.3
1,000	57.6	57.5
1,500	54.9	54.9
2,000	52.9	52.9
2,500	51.3	51.3

Source: AFOSH 1994; SAIC 2002

From Figure 4-2, the threshold level of 62 L_{Cdn} would not extend onto residential areas at the MOUT facility or the southeast corner of the D-51 South Training area, though overall noise would affect a greater area (and thus more people) than the alternative action. The noise projections are based on expenditures of 1,000 rounds and may be more or less depending on the actual number of rounds expended. High and medium density residential areas would potentially be exposed to noise between 53 and 55 L_{Cdn} from small arms events at the closest areas of the RTC D-51 South MOUT facility and training areas (Figure 4-2).

Based on the analysis, noise impacts would be minimal, with a low risk of annoyance to the public. Spreading out small arms fire and focusing the majority of this activity within the interior of the training areas or primarily within the LZ East training area, would further minimize any potential for noise impacts. Conversely, concentrating small arms fire at any one location, especially those close to residential areas, such as the MOUT facility at D-51 South, may generate noise complaints from the public. Wooded areas between the RTC locations and residential areas would help dampen small arms noise, as would the walls of the MOUT facility.

4.7.2 Action Alternative

The action alternative would place the MOUT and garrison facilities of D-51 South north of Highway 20. Figure 4-4 also contains noise contours from the Action Alternative MOUT location. Noise between 53 and 55 L_{Cdn} would reach high-density residential areas of the Bluewater Bay community, which is below the 62 L_{Cdn} threshold for annoying 15% of the public. Some fraction less than 15% may still be annoyed by the noise from the MOUT exercises, which are approximately 1,990 feet from the closest residential area of Bluewater Bay. This alternative would expose the nearest residential area to slightly less noise than the proposed action.

4.7.3 No Action Alternative

This alternative would not result in the establishment of an AFMC Regional Ground Combat Training Center on Eglin AFB. AFMC would continue to be dependent on ACC and AMC to provide SF ground combat training. No environmental impacts are associated with this alternative since no action would be taken.

4.7.4 Environmental Justice Impacts from Noise

There would be no environmental justice impacts from noise since noise thresholds would not be exceeded for any community.

4.8 SAFETY

4.8.1 Proposed Action

Prior to RTC training activities, Eglin Explosive Ordnance Disposal will conduct a survey for UXO within the training areas. Possible methods include surface sweeps and sub-surface detection with metal detectors or other means. Buried UXO may be excavated or trees may have to be cleared, and this process may inherently have additional environmental concerns related to soil disturbance or habitat alteration, plus considerable costs may be incurred. The extent of this disturbance depends on the amount and type of UXO found. Additional environmental documentation may be required to assess these impacts; at present the amount of disturbance is unknown and is not analyzed here.

Not all UXO may be detected during EOD sweeps, or new items may be deposited. In this respect, UXO may present an ongoing safety concern for RTC trainees. The potential for a UXO mishap is unknown and no attempt is made to analyze this here. The potential simply exists and precautions would be made to avert such mishaps through UXO surveys and education of incoming trainees on how to spot, avoid, and/or report any observance of UXO.

4.8.2 Action Alternative

UXO concerns would be the same under this alternative. Additional environmental documentation would still be required for potential effects of EOD UXO surveys and, if necessary, excavations and tree clearing.

4.8.3 No Action

UXO surveys would not be conducted under this alternative. The RTC Readiness Training Center would not be constructed and the risk of UXO encounters would be lessened.

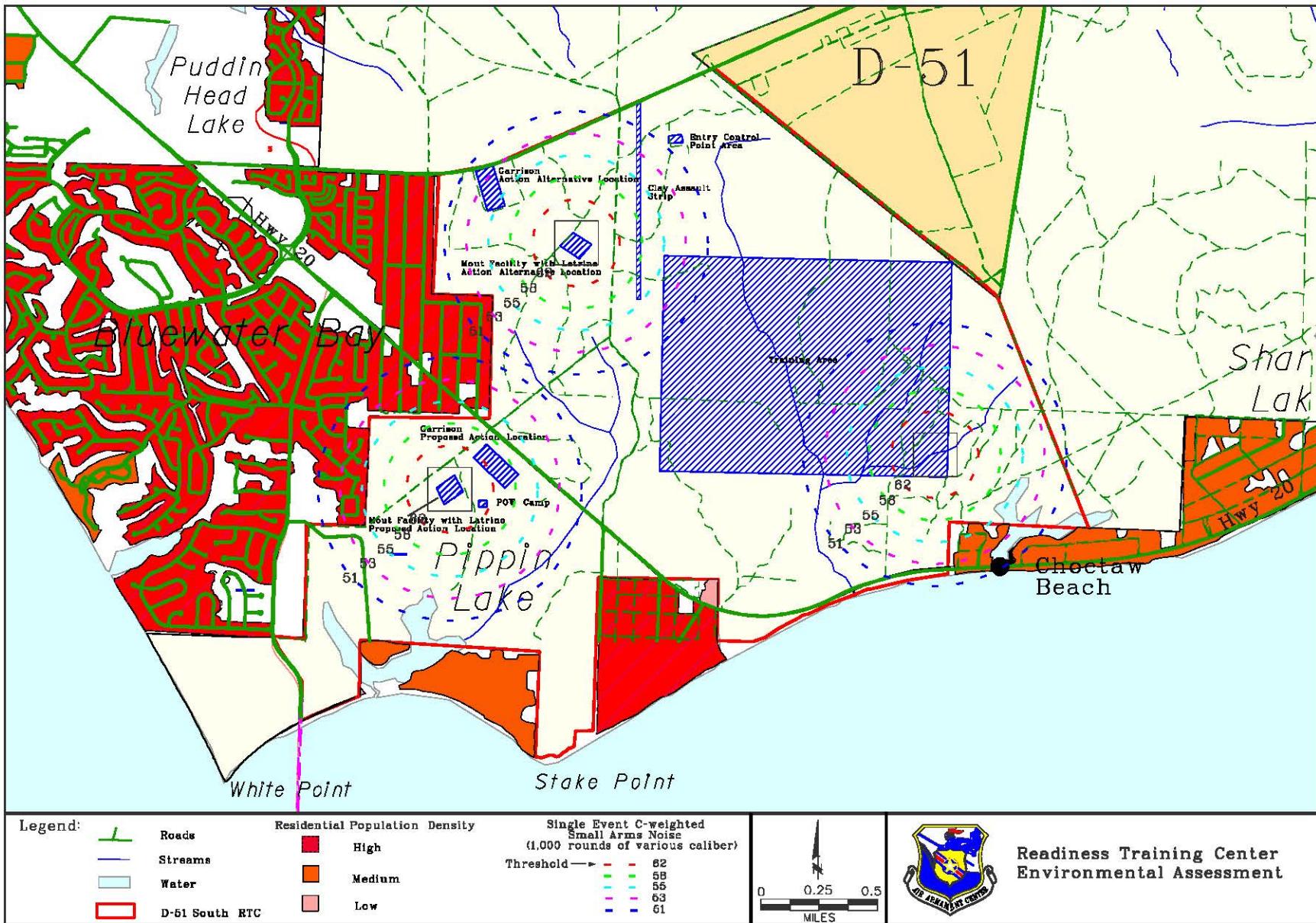


Figure 4-4. Small Arms Noise from the Proposed Action and Alternative

5. RTC MISSION SUSTAINABILITY MANAGEMENT REQUIREMENTS AND CONSIDERATIONS

The anticipated level of land disturbance, generation of by-products, and safety issues associated with the proposed action sources would potentially have direct and indirect effects on the physical and biological environment. Management of the level, intensity, and frequency of training activities and dynamic variables associated with features and processes of the affected environment is necessary to ensure the long-term sustainability of the RTC mission. The mission depends on the long-term support of an environment that is diverse (with respect to the availability of natural terrain and diverse vegetation) and an ecosystem that is healthy, self sustaining and able to recover from impacts associated with the RTC activities. Decline in the health and recovery capability of RTC ecosystems would result in a loss of training efficiency and effectiveness. Therefore, steps taken to maximize biological diversity and ecosystem recovery would increase training scenario realism, flexibility and capabilities.

The proponent, in coordination with AAC/EMSP, has developed action-specific RTC mission sustainability management practices to minimize potential environmental impacts associated with the proposed action and maximize training capabilities. Natural (wetlands, Tier I habitats and significant botanical sites) or cultural resource areas that should be avoided are illustrated in Figures 5-1 and 5-2.

Eglin Standard Practices

- A restriction of a maximum of 140 dB noise level leaving the Eglin Reservation boundary.
- No detonation can produce a seismic shock of more than 1 inch/sec peak particle velocity when reaching any structure.
- All inert munitions on or near the surface are recovered, removed, and destroyed.
- The use of all pyrotechnic devices will be under the supervision of qualified personnel
- Pyrotechnic devices that dud will not be disturbed, but will be flagged. Explosive Ordnance Disposal (EOD) will be notified for dud disposal.
- The number of smoke grenades used each month must be reported to AAC/EMCE for air monitoring purposes.
- All munitions expenditures (including pyrotechnics and blanks) will be recorded for reporting to AAC/EMCW.
- All residue and debris produced for mission activities will be gathered and appropriately disposed of/recycled.
- Obtain stormwater permits for construction that disturbs land areas of five acres or more.
- Report the location of UXO to Security Police or Eglin Explosive Ordnance Disposal.

Recommendations for the AFMC Readiness Training Center

- Notify Range Operations Control Center (ROCC) of field training schedules to prevent inadvertent prescribed burning or other operations in the area during training periods
- Coordinate field training with the Resource Scheduling and Operational Management System (RESOMS) to verify wildfire condition status, manage the use of pyrotechnics as appropriate with fire index conditions, and possible evacuations due to hot missions.
- Report the number of smoke grenades used during training missions to AAC/EMCE for air monitoring purposes.
- Avoid disturbance of wildlife food plots (U.S. Army Corps of Engineers, 1996).
- Avoid conduct of military activities within areas designated as forestry research plots or restoration sites unless the Eglin Natural Resources Branch has given specific written authorization (U.S. Army Corps of Engineers, 1996).
- Coordinate planned use of pyrotechnics, explosives, or powerful munitions in the vicinity of forestry research or sensitive species restoration areas with Eglin Natural Resources Branch (U.S. Army Corps of Engineers, 1996).
- Complete cultural resource surveys, consultation, and mitigations before the project begins. Any subsequent cultural resource discoveries must be reported immediately to AAC/EMH.
- Follow Regulations on Debris and Hazardous Materials for Cleanup: Cleanup debris and hazardous materials should be conducted according to appropriate regulations.
- Report violations of any recreation rules to the Eglin Natural Resources Branch or the security police (U.S. Army Corps of Engineers, 1996).
- Ensure that all military activities are in compliance with the hunting, trapping, and fishing regulations established by the Natural Resources Branch and the Florida Fish and Wildlife Conservation Commission (FFWCC), unless specific authorization is granted by the Natural Resources Branch and the FFWFCC (U.S. Army Corps of Engineers, 1996).
- Keep wheeled vehicles to existing trails/roads unless there is special authority to do otherwise.
- Coordinate all military activities that are within or near stands of mature long-leaf pine and scheduled during red-cockaded woodpecker nesting season (late April-July) with the Natural Resources Branch (U.S. Army Corps of Engineers, 1996)
- Adhere to the specific action guide regarding forest fire danger ratings.
- Prior to land clearing and construction activities, the area would be surveyed by Air Armament Center, Natural Resources (AAC/EMSN) to determine if gopher tortoises are present. Tortoises found in the area would be captured and relocated prior to clearing and construction. Sensitive species located in tortoise burrows would also be captured and relocated as required.
- Military activities should not be conducted on the identified legacy munitions debris pit areas at the westernmost end of TA D-51.

RTC Mission Sustainability Management Requirements and Considerations

- For road widening and upgrading, use Eglin CE Best Management Practices. Road work must be accomplished in compliance with Chapter 404 of the Clean Water Act, Florida Administrative Code 62-312, and with the January 01 Eglin Air Force Base Road Maintenance Handbook.
- Avoid marked or known locations and areas of sensitive plant occurrence.
- In situations where a hot air or ground mission footprint encompassed the RTC area, RTC personnel and trainees would be required to evacuate.
- Avoid marked or known locations of cultural resources. Coordination between AAC/EMH and the proponent would be required to determine appropriate marking procedures.

RTC Mission Sustainability Management Requirements and Considerations

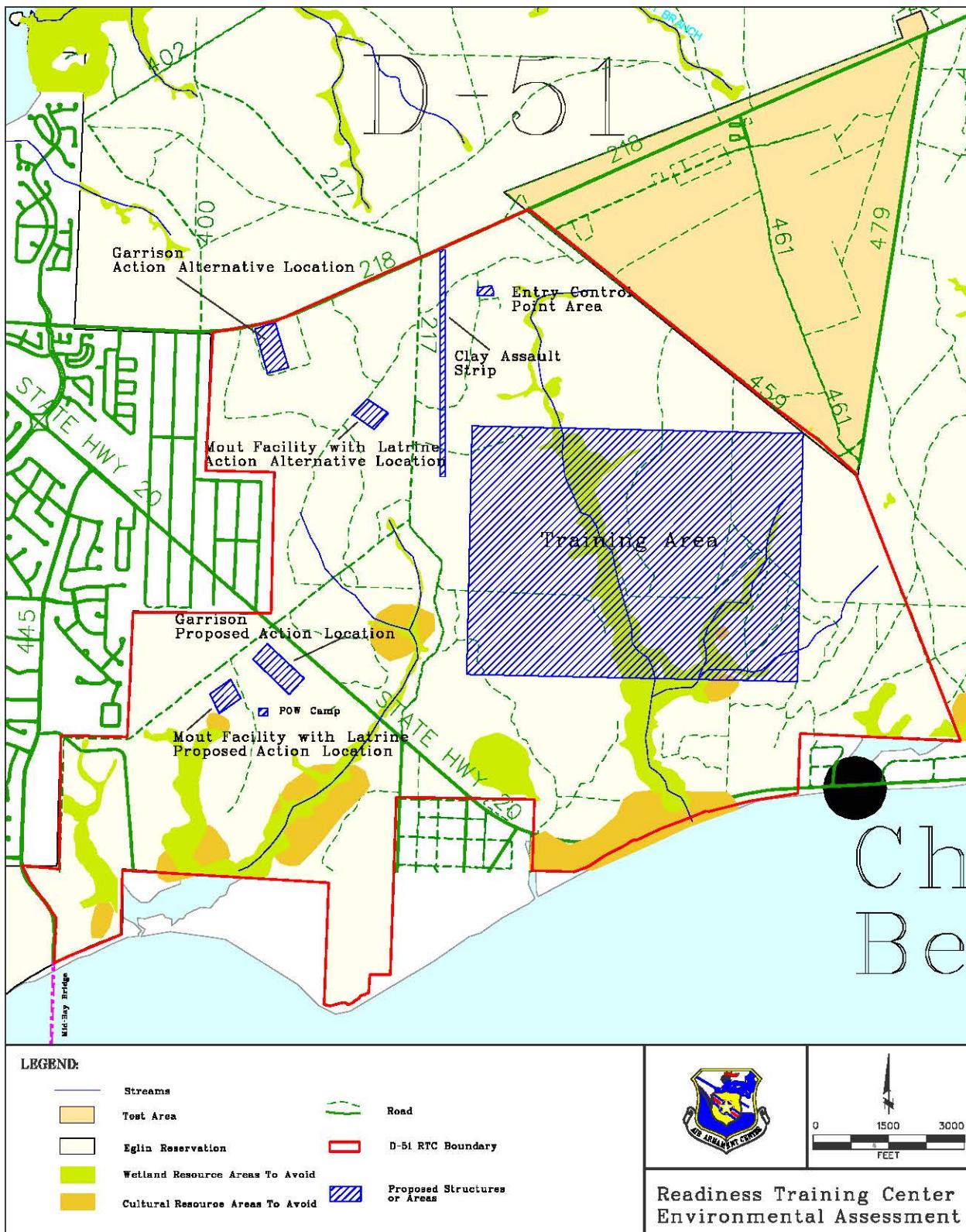


Figure 5-1. Areas to Avoid at the D-51 South RTC Location

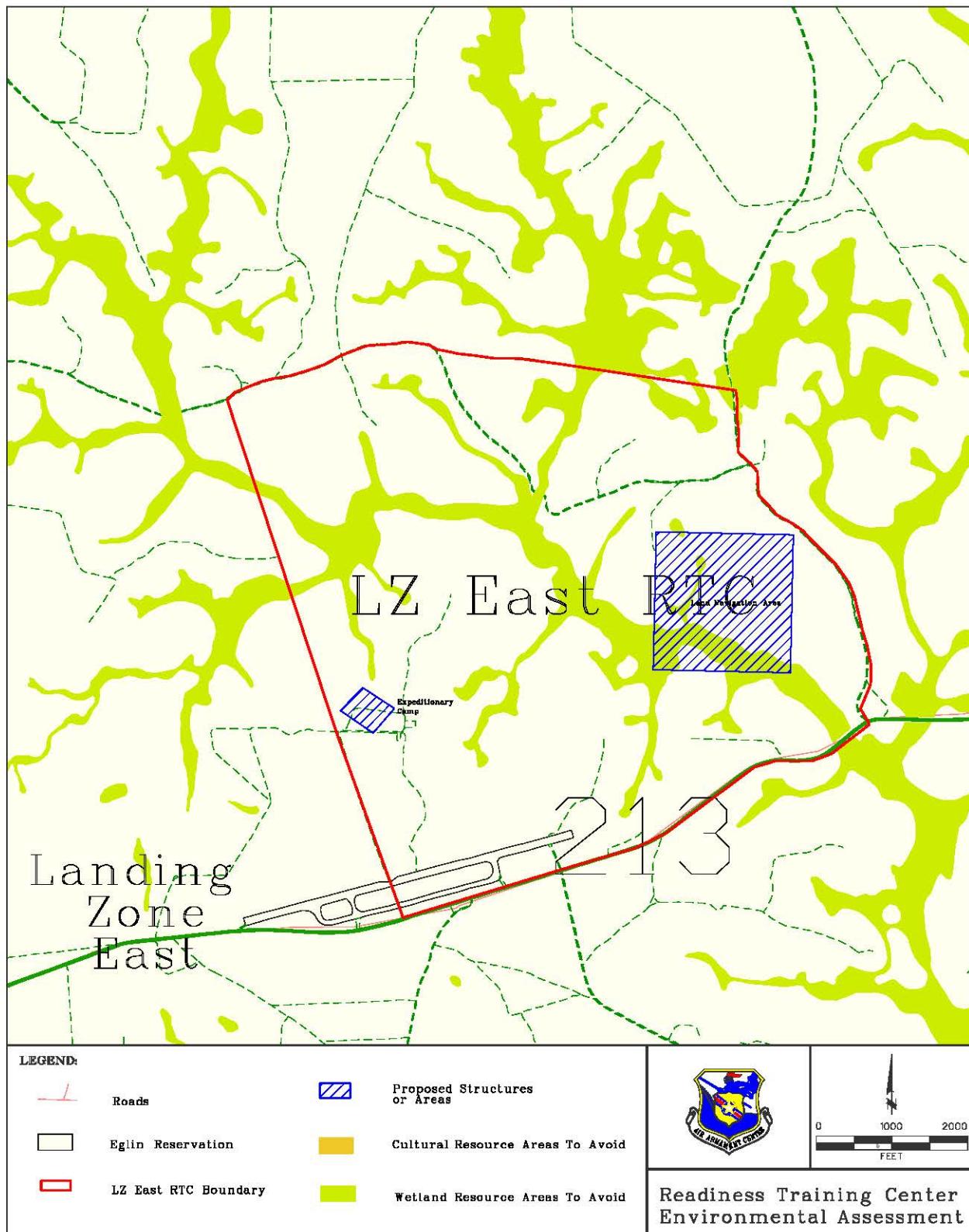


Figure 5-2. Areas to Avoid at the LZ East RTC Location

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References

8. REFERENCES

Air Force Occupational Safety and Health (AFOSH) Standard 48-19. 1994. Aerospace Medicine Hazardous Noise Program. March

American Ornithologists' Union, 1957. *Checklist of North American Birds*. 5th Edition, The Lord Baltimore Press Inc., Baltimore, MD.

Anderson, D. G. and V. Harak, 1993. *Site Destruction in Georgia and the Carolinas*. Interagency Archeological Services Division, National Park Service, Atlanta, Georgia.

Bent, A. C., 1962. *Life Histories of North American Wild Fowl*. Part 1. Dover Publications, Inc., New York, NY.

Beschta, R. L. and W. S. Platts, 1986. Morphological Features of Small Streams: Significance and Function. *Water Resources Bulletin*, 22(3), pp 369-379.

Bohall-Wood, P. and M. W. Collopy, 1986. Abundance and habitat selection of two American kestrel subspecies in north central Florida. *Auk*. 103, 557-563.

Brano H., 1994. *Eglin Air Force Base Climatology*. 46th Test Wing, Air Force Development Test Center, Eglin Air Force Base, Florida.

Chafin, L. G. and A. R. Schotz, 1995. *Rare Plant Survey of Eglin Air Force Base, 1992-1994: Final Report*. Florida Natural Areas Inventory, Tallahassee, FL, June 1995.

Clark, M. W. and W. Schmidt, 1982. *Shallow Stratigraphy of Okaloosa County and Vicinity, Florida*. State of Florida, Department of Natural Resources, Bureau of Geology, Tallahassee, FL, Report of Investigation No. 92.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe, 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Department of the Interior, Fish and Wildlife Service, Biological Services Program. FWS/OBS-79/31. December 1979.

DeGraaf, R. M., V. E. Scott, and R. H. Hamre, 1991. *Forest and Rangeland Birds of the United States: Natural History and Habitat Use*. U.S. Department of Agriculture, Forest Service, Washington D.C., Agricultural Handbook 688.

Fischer, D. L., K. L. Ellis, and R. J. Meese, 1984. Inter habitat selection of diurnal raptors in central Utah. *Raptor Research*, 18(3) pp 98-102.

Florida Coastal Management Program, 2000. *Florida Assessment of Coastal Trends*. Florida Department of Community Affairs, Tallahassee, FL.

FNAI (Florida Natural Areas Inventory), 1997. *Eglin Air Force Base Natural Community Survey, Final Report*. Florida Natural Areas Inventory. Tallahassee, Fl.

_____, 2002. Florida Natural Areas Inventory Online Data. <http://www.fnai.org/dev/data.cfm>. Updated October 2002.

Gassman, P. W., D. C. Erbach, and S. W. Melvin, 1989. Analysis of Track and Wheel Soil Compaction. *Transactions of the ASAE*, 32(1):23-29.

Gucinske, H., M. J. Furniss, R. R. Ziemer, and M. H. Brooks (Eds.), 2000. *Forest Roads: A Synthesis of Scientific Information*. U.S. Department of Agriculture.

Hallam, C. O., K. Wheaton, and R. A. Fischer, 1998. Species Profile: Eastern Indigo Snake (*Drymarchon corais couperi*) on Military Installations in the Southeastern United States. Technical Report SEWDP-98-2, U. S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

References

Hamilton, R. J. and R. L. Marchinton, 1980. Denning and related activity of black bears in the coastal plain of North Carolina. In: C. J. Martinda and K. L. McArthur (eds.). *Bears: Their Biology and Management*: Proceedings, 4th International Conference on Bear Research and Management, 21-24 February 1977, Kalispell, MT, Conference Series No. 3., Washington, D.C., Bear Biology Association, pp 121-126.

Hatchell, G. E, C. W. Ralston, and R. R. Foil, 1970. Soil Disturbances in Logging: Effects on Soil Characteristics and Growth of Loblolly Pine in the Atlantic Coastal Plain. *Journal of Forestry*, 68:371-373.

Hellgren, E. C. and M. R. Vaughan, 1989. Denning ecology of black bears in a southeastern wetland. *Journal of Wildlife Management*, 53, pp 347-353.

Hoffman, M. L. and M. W. Collopy, 1987. Distribution and nesting ecology of the American kestrels in relation to habitat use. *Raptor Research Reports*, 6, pp 47-57.

_____, 1988. Historical status of the American kestrel (*Falco sparverius paulus*) in Florida. *Wilson Bulletin*, 100(1), pp 91-107.

Hogan, T., 2000. *Controls on Plant Size and Reproductive Vigor in the Rare Alabama Spiny-Pod Matelea Alabamensis (Vail) Woodson*. Thesis. University of Florida.

Hooper, R. G, A. F. Robinson, and J. A. Jackson, 1980. *The Red-Cockaded Woodpecker: Notes on Life History and Management*. U.S. Department of Agriculture, Forest Service, Southeastern Area, General Report SA-GR 9.

Hooper, R. G. and R. F. Harlow, 1986. Forest Stands Selected by Foraging Red-Cockaded Woodpeckers. USDA, Forest Service, Southern Forest Experimentation Station, Research Paper SE-259.

Jonkel, C., 1978. Black, brown (grizzly) and polar bears. In: J. L. Schmidt and D. L. Gilbert (eds.). *Big Game of North America*. Stackpole Books, Harrisburg, PA, pp 227-248.

Jordan, R. A., 1998. *Species Profile: Pine Snake (*Pituophis melanoleucus spp.*) on Military Installations in the Southeastern United States*. U.S. Army Corps of Engineers, Waterways Experiment Station. Technical Report SERDP-98-5, March 1998.

Kale, H. W. II (ed), 1978. *Birds, Volume II*. Published for the State of Florida Game and Fresh Water Fish Commission by the University Presses of Florida, Gainesville, FL.

Koshman, H. I., 1978. Eastern Indigo Snake. In: R. W. McDiamicid (ed.). *Rare and Endangered Biota of Florida, Amphibians and Reptiles*, Vol. 3, University Florida Press, Gainesville, Florida.

Landers, J. L. and J. L. Buckner, 1981. The gopher tortoise: Effects of forest management and critical aspects of its ecology. *Southlands Experimental Forestry Technical Note No. 56*, 7 pp.

Lennartz, M. R., 1988. The red-cockaded woodpecker: Old-growth species in a second-growth landscape. *Natural Areas Journal*, 8(3):160-165.

Ligon, J. D., 1963. Breeding Range Expansion of the Burrowing Owl in Florida. *Auk*, 80, pp. 367-368.

Lips, K. R., 1991. Vertebrates associated with tortoise (*Gopherus polyphemus*) burrows in four habitats in south-central Florida. *Journal of Herpetology* 25:477-481.

Litt, A. R., J. P. McAdoo, J. L. Hardesty, and D. R. Gordon, 2000. Ecology and Management of Stream Aquatic Ecosystems on Eglin Air Force Base: Overview, Threats, and Strategies. Summary of the workshop held at Eglin Air Force Base, 1-3 November 1999. The Nature Conservancy, Niceville, Florida.

Livingston, R. J., 1987. *Distribution of Toxic Agents and Biological Response of Infaunal Macroinvertebrates in the Choctawhatchee Bay System*, CARRMA, Florida State University, Tallahassee, FL.

Loftin, R. W., 1992. Use of nest boxes by the Florida kestrel. *Florida Field Naturalist*, 20(3), pp 57-88.

References

Luce, C. H., 1997. Effectiveness of Road Ripping in Restoring Infiltration Capacity of Forest Roads. *Restoration Ecology*, 5(3): 265-270.

Marsh, O. T., 1966. Geology of Escambia and Santa Rosa Counties, Western Florida Panhandle. Prepared by the U.S. Geological Survey. Tallahassee, Florida.

Minerals Management Service (MMS), 1990. *Gulf of Mexico Sales 131, 135, and 137: Central, Western and Eastern Planning Areas Final Environmental Impact Statement*, Volume I: Sections I through IV.C. Minerals Management Service, Gulf of Mexico OCS Region, New Orleans. MMS 90-0042.

and

_____, 1990. *Gulf of Mexico Sales 131, 135, and 137: Final Environmental Impact Statement*. Vol II: Sections IV.D through IX. U.S. Department of the Interior, Minerals Management Service Gulf of Mexico OCS Regional Office, New Orleans, LA. OCS EIS/EA MMS 90-0042. pp. G-3 – G-16.

Morgan, R. P. C., 1995. *Soil Erosion and Conservation*. Addison Wesley Longman Limited, Essex, England.

Mueller, H. C., 1987. Prey selection by kestrels: A review. *Raptor Research Reports*, 6, pp 3-106.

Mushinsky, H. R. and McCoy, E. D., 1994. Comparison of gopher tortoise populations on islands and on the mainland in Florida. In: Bury, R. B. and Germano, D. J. (eds). *Biology of North American Tortoises*. National Biology Survey, Fish and Wildlife Research 13, pages 37-49.

New York State Department of Environmental Protection, 2001. *Assessing and Mitigating Noise Impacts*. Division of Environmental Permits. February.

Northwest Florida Water Management District, 1993. Preliminary Hydraulic Assessment of the Walton/Okaloosa/ Santa Rosa Regional Utility Authority's Western Sub-Regional Well Field. Water Resources Special Report 93-1.

Noss, R. R., 1987. Protecting natural areas in fragmented landscapes. *Natural Areas Journal*, 10, pp 121-128.

_____, R. R., 1989. Longleaf Pine and Wiregrass: Keystone Components of an Endangered Ecosystem. *Natural Areas Journal*, 9(4), pp 211-213.

Pater, L. L., 1976. *Noise Abatement Program for Explosive Operations at NSWC/DL*. Seventeenth Explosives Paper Seminar of the DDESB at Denver, Colorado, September 1976. Approved for public release; distribution limited.

Provencher, L., A. R. Litt, K. E. M. Galley, D. R. Gordon, G. W. Tanner, L. A. Brennan, N. M. Gobris, S. J. McAdoo, J. P. McAdoo, and B. J. Herring, 2001. Restoration of Fire-Suppressed Longleaf Pine Sandhills at Eglin Air Force Base, Florida. Interim Final Report to the Natural Resources Management Division, Eglin Air Force Base Florida, Niceville, Florida. Science Division, The Nature Conservancy, Gainesville, Florida.

Puckett, C. and R. Franz, 1991. *The Gopher Tortoise: A Species in Decline*. Gopher Tortoise Council. University of Florida, Florida Cooperative Extension Service.

Resource Consultants and Engineers, Inc., 1993. *Geomorphic Investigation of Eglin Air Force Base, Florida: Implications for Distribution of the Okaloosa Darter (Etheostoma okaloosa) and Brown Darter (Etheostoma edwini)*. U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, Mississippi, Report No. 92-904.

Rogers, L. L. and A. W. Allen, 1987. *Habitat suitability index models: Black bear, upper Great Lakes region*. U.S. Department of Interior, Fish and Wildlife Service, Washington, D.C., Biological Report 82.

SAIC (Science Applications International Corporation), 1999. *Water Resources of the Northwest Florida Water Management District (Santa Rosa, Okaloosa, and Walton Counties)*. Fort Walton Beach, Florida.

References

Schmidt, W., 1984. Notes on the Geology of Walton County. State of Florida, Department of Natural Resources, Florida Geological Survey, Tallahassee, FL, Open File Report 3.

Smallwood, J. A. and M. W. Collopy, 1993. Management of the threatened southeastern American kestrel in Florida: Population responses to a regional nest-box program. *Journal of Raptor Research*, 27(1), p 81.

Speake, D. W., J. A. McGlincy, and T. A. Colvin, 1978. Ecology and Management of the Eastern indigo snake in Georgia: Progress Report. In: R. R. Odum and L. Landers (eds.). *Proceedings of Rare and Endangered Wildlife Symposium*. Georgia Department of Natural Resources, Game and Fish Division, Technical Bulletin WL4. Pages 64-73.

Studenroth, K. R. Jr., 1994. Carnivorous Plants. Thesis for General Biology II. 18 April 1994.

U.S. Air Force, 1976. *Eglin Reservation Explosives Contamination*. Directorate of Safety Armament Development and Test Center, Eglin Air Force Base, Florida.

_____, 1995. *Environmental Baseline Study Resource Appendices*. Prepared by Earthtech for the Air Force Development Test Center, 46th Test Wing, Range Environmental Planning Office, Eglin AFB, Florida.

_____, 1997. *Interstitial Area Environmental Baseline Document*. Air Force Development Test Center, Eglin Air Force Base, Florida. October 1997

_____, 1997a. *Eglin AFB Operational Climatic Data Summary*, U.S. Air Force Combat Climatology Center, September 1997.

_____, 2000. *Installation Restoration Program Management Action Plan*. Air Force Developmental Test Center, Eglin AFB, Florida. July 2000.

_____, 2000a. Personal communication SAIC with Ray Sears, Eglin AFB, FL. November 2000.

_____, 2001. *Integrated Natural Resources Management Plan (INRMP)*. Department of the Air Force, Eglin Air Force Base, Florida.

_____, 2001a. Personal communication SAIC with Justin Johnson, Eglin AFB, FL. January 2001.

_____, 2002. Personal communication with Eglin Natural Resources regarding fire potential and impacts associated with the proposed action. October 15.

U.S. Army, 2001. *Environmental Noise Management, An Orientation Handbook for Army Facilities*. U.S. Army Center for Health Promotion and Preventive Medicine. Aberdeen Proving Ground, Maryland. May 2001.

U.S. Army Corps of Engineers, 1996. *Unit Environmental Coordinator (UEC) Environmental Handbook, Eglin Air Force Base*. Prepared by CH2M Hill. October 1995.

_____, 1999. *Foot Traffic Effects on Grassland Soil Properties at the U.S. Air Force Academy, Colorado*. Engineer Research and Development Center. CERL Technical Manuscript 99/98.

U.S. Department of Agriculture (USDA), 1989. *Soil Survey of Walton County, Florida*. Soil Conservation Service.

_____, 1995. *Soil Survey of Okaloosa County, Florida*. Soil Conservation Service.

_____, 1998. *Keys to Soil Taxonomy*. Natural Resources Conservation Service, Washington, D.C.

U.S. Environmental Protection Agency (USEPA), 1985. *Compilation of Air Pollution Emission Factors, Vol. II: Mobile Sources, (AP-42), Fourth Edition*. U.S. Environmental Protection Agency, Motor Vehicle Emissions Laboratory, Ann Arbor, MI. September 1985.

References

_____, 1988. *Gap Filling PM10 Emission Factors for Selected Open Dust Sources*, EPA-450/4-88-003. U.S. Environmental Protection Agency, February 1988.

Williamson, G. K. and R. A. Moulis, 1979. *Survey of Reptiles and Amphibians on Fort Stewart and Hunter Army Airfield*. Report to the U.S. Army, Fort Stewart, Georgia.

Wilson, D. S., H. R. Mushinsky, and R. A. Fisher, 1997. *Species Profile: Gopher Tortoise (Gopherus polyphemus) on Military Installations in the Southeastern United States*. U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS. Technical Report SER DP-97-10.

Wolfe, S. H., J. A. Reidenauer and D. B. Means, 1988. Ecological characterization of the Florida panhandle. *U.S. Fish and Wildlife Service Biological Report 88(12)*. Minerals Management Service 88-0063. Washington, D.C. New Orleans.

Wood, D. A. 1996. *Florida's Endangered Species, Threatened Species, and Species of Special Concern, Official Lists*. Published by Bureau of Nongame Wildlife, Division of Wildlife, Florida Game and Fresh Water Fish Commission.

APPENDIX A

RELEVANT AND PERTINENT LAWS, REGULATIONS, AND POLICIES

RELEVANT AND PERTINENT LAWS, REGULATIONS, AND POLICIES

During preparation of the EA, relevant and pertinent environmental laws, regulations, and policies were considered. This appendix summarizes such federal executive orders and laws; DoD directives and instructions; Air Force instructions and policy directives; and Florida state statutes and administrative codes. The laws and regulations addressed herein are the most relevant laws, regulations, and policies, pertinent to the proposed RTC activities. It is further recognized that additional relevant and pertinent laws and regulations may exist.

The following summarizes laws, regulations, and policies, and discusses aspects of federal listed species consultations, Clean Water Act, Florida Watershed Restoration Act, Jurisdictional Wetland Protection, and Floodplain Management that could have current and future implications for the proposed RTC.

General

32 CFR Part 989, 15-Jul-99, The Environmental Impact Analysis Process. Provides a framework for how the Air Force is to comply with NEPA and the CEQ regulations.

42 USC 4321 et seq, 1969, National Environmental Policy Act of 1969 (NEPA). Requires that federal agencies (1) consider the consequences of an action on the environment before taking the action and (2) involve the public in the decision-making process for major federal actions that significantly affect quality of the human environment.

Executive Order 12372, 14-Jul-82, Intergovernmental Review of Federal Programs. Directs federal agencies to inform states of plans and actions, use state processes to obtain state views, accommodate state and local concerns, encourage state plans, and coordinate states' views.

Executive Order 12856, 3-Aug-93, Right-to-Know Laws and Pollution Prevention Requirements. Directs all federal agencies to incorporate pollution planning into their operations and to comply with toxic release inventory requirements, emergency planning requirements, and release notifications requirements of EPCRA.

Air Force Policy Directive 32-70, 20-Jul-94, Environmental Quality. Develops and implements the Air Force Environmental Quality Program composed of cleanup, compliance, conservation, and pollution prevention.

Air Force Instruction 13-212 v1 and v2; 1994, Weapons Ranges and Weapons Range Management. Establishes procedures for planning, construction, design, operation, and maintenance of weapons ranges as well as defines weapons safety footprints, buffer zones, and safest procedures for ordnance and aircraft malfunction. Identifies range activities that require a Test and Training Space Needs Statement (T/TSNS).

Air Force Instruction 32-7045, 1-Apr-94, Environmental Compliance and Assessment. Implements AFPD 32-70 by providing for an annual internal self-evaluation and program management system to ensure compliance with federal, state, local, DoD, and Air Force environmental laws and regulations.

Air Force Instruction 32-7062, 1-Apr-94, Air Force Comprehensive Planning. Implements AFPD 32-70 by establishing Air Force Comprehensive Planning Program for development of Air Force Installations, ensuring that natural, cultural, environmental, and social science factors are considered in planning and decision making.

Air Force Instruction 32-7064, 22-Jul-94, Integrated Natural Resources Management. Provides for development of an integrated natural resources management plan to manage the installation ecosystem and integrate natural resources management with the rest of the installation's mission. Includes physical and biological resources and uses.

Physical Resources

Air Quality

42 USC 7401 et seq. and 40 CFR Parts 50 & 51, 1996, Clean Air Act, National Ambient Air Quality Standards (CAA, NAAQS). Stipulates that emissions sources must comply with air quality standards and regulations established by federal, state, and local regulatory agencies.

Air Force Policy Directive 32-70; 20-Jul-94; Environmental Quality; Develops and implements the Air Force Environmental Quality Program composed of cleanup, compliance, conservation, and pollution prevention. Implements Clean Air Act.

Air Force Instruction 32-7040, 9-May-94, Air Quality Compliance. Sets forth actions for bases to implement to achieve and maintain compliance with applicable standards for air quality compliance, and responsibilities for who is to implement them. Includes requirements for NEPA and RCRA as well as CAA.

F.S. Ch. 403, Part I, 1996, Florida Air and Water Pollution Control Act. Regulates air pollution within the state.

F.A.C. Chap. 62-204, 1996, Florida State Implementation Plan, with Ambient Air Quality Standards and PSD Program. Establishes state air quality standards and requirements for maintaining compliance with NAAQS.

Land Resources

16 USC 670a to 670o, 1997-Supp, Sikes Act, Conservation Programs on Military Reservations. Provides that DoD, in a cooperative plan with DOI and the state, opens Air Force bases to outdoor recreation, provides the state with a share of profits from sale of resources (timber), and conserves and rehabilitates wildlife, fish, and game on each reservation. Air Force is to manage the natural resources of its reservations to provide for sustained multipurpose use and public use

USC 1701 et seq., (Public Law 94-579), 1997-Supp, Federal Land Policy and Management Act of 1976 (FLPMA). Provides that the Secretary of Interior shall develop landuse plans for public lands within Bureau of Land Management jurisdiction to protect scientific, scenic, historical, ecological, environmental, and archeological values, and to accommodate needs for minerals, food, and timber.

Air Force Instruction 32-7062, 1-Apr-94, Air Force Comprehensive Planning. Implements AFPD 32-70 by establishing Air Force Comprehensive Planning Program for development of Air Force installations, ensuring that natural, cultural, environmental, and social science factors are considered in planning and decision making.

Air Force Instruction 32-7063, 31-Mar-94, Air Installation Compatible Use Zone Program (AICUZ). Provides a framework to promote compatible development within area of AICUZ area of influence and protect Air Force operational capability from the effects of landuse that are incompatible with aircraft operations.

Water Resources

USC 33, Chapter 26. Clean Water Act (CWA). In 1972, the Federal Water Pollution Control Act or Clean Water Act (CWA) was amended from its original form and signed into law (P.L. 92-500). The intention of the CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. The two sources of water pollution defined by the CWA are point source and nonpoint source (NPS) pollution. Point source is a discrete, identifiable discharge point and NPS is the result of toxic and/or nontoxic substance entrance into water bodies through storm event runoff from snowmelt, translocation by wind, and precipitation.

Water quality regulation in the United States is largely based on the maintenance and enhancement of the designated beneficial uses of water. The CWA overall goals and amendments are couched in terms such as "swimmable," "fishable," and "the propagation of aquatic life." The policies and mechanisms to achieve these goals such as water quality standards, best management practices, antidegradation, and total maximum daily loads (TMDLs) all relate back to this concept of the designated beneficial use of the water body.

In crafting the CWA, Congress excluded NPS pollution from regulatory enforcement because point source pollution was considered the primary source of water pollution and sources of NPS pollution are difficult to isolate. However, the U.S. Environmental Protection Agency (USEPA) considers sedimentation (a NPS pollutant) the second leading cause of water quality impairment.

NPS pollution control compliance is primarily voluntary and does not fall under the permitting scope of the National Pollution Discharge Elimination System (NPDES). To mitigate, Congress enacted Section 319 of the CWA to provide states with grant allocations to develop NPS management plans and implement Best Management Practices (BMPs).

The CWA as amended in 1987, Section 319, placed special importance on the need to control nonpoint source pollution. The CWA states that nothing can be introduced into a stream or other water body that could potentially pollute the water, and that programs for the control of nonpoint sources of pollution should be developed and implemented in an expeditious manner so as to enable the achievement of the nonpoint source goals of the CWA. Historically, the CWA has lacked nonpoint source pollution enforcement mechanisms. However, in response to lawsuits by environmental groups, the EPA has developed a program to enforce the control of nonpoint source pollution. The EPA seeks to enforce Section 303 (d) of the CWA by requiring state agencies to establish TMDL plans for listed impaired water segments.

33 USC 1251 et seq.; 1997-Supp, Clean Water Act (CWA) (Federal Water Pollution Prevention and Control Act, FWPCA). In addition to regulating navigable water quality, CWA establishes NPDES permit program for discharge into surface waters and storm water control; U.S. Army Corps of Engineers permit and state certification for wetlands disturbance; regulation of ocean discharge; sewage wastes control; and oil pollution prevention.

33 USC 1344-Section 404, 1997-Supp, Clean Water Act (CWA) (Federal Water Pollution Control Act, FWPCA), Dredged or Fill Permit Program. Regulates development in streams and wetlands by requiring a permit from the U.S. Army Corps of Engineers for discharge of dredged or fill material into navigable waters. A Section 401 (33 USC 1341) certification is required from the state as well.

42 USC 300f et seq., 1997-Supp, Safe Drinking Water Act (SDWA). Requires the promulgation of drinking water standards, or maximum contaminant levels, which are often used as cleanup values in remediation; establishes the underground injection well program; and establishes a wellhead protection program.

42 USC 6901 et seq., 29-May-05, Resource Conservation and Recovery Act of 1976 (RCRA). Establishes standards for management of hazardous waste so that water resources are not contaminated: RCRA Corrective Action Program requires cleanup of groundwater that has been contaminated with hazardous constituents.

42 USC 9601 et seq., Public Law 96-510, 11-Dec-80; Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). Establishes the emergency response and remediation program for water and groundwater resources contaminated with hazardous substances.

Air Force Policy Directive 32-70, 20-Jul-94, Environmental Quality. Develops and implements the Air Force Environmental Quality Program composed of cleanup, compliance, conservation, and pollution prevention. Implements Clean Water Act, Safe Drinking Water Act, and Water Quality Act of 1987.

Air Force Instruction 32-7041, 13-May-94, Water Quality Compliance. Instructs the Air Force on maintaining compliance with the Clean Water Act; other federal, state, and local environmental regulations; and related DoD and AF water quality directives.

Florida Statutes Chap. 403, Part I, Florida Air and Water Pollution Control Act. Establishes the regulatory system for water resources in Florida.

Florida Administrative Code Chap. 62-302, 1995, Surface Water Quality Standards. Classifies Florida surface waters by use. Identifies Outstanding Florida Waters.

Florida Administrative Code Chap. 62-312, 1995, Florida Dredge and Fill Activities. Requires a state permit for dredging and filling conducted in, on, or over the surface waters of the state.

Florida Administrative Code Chap. 62-4. Permits. Establishes procedures on how to obtain permits from the State of Florida Department of Environmental Protection.

Florida Administrative Code Chap. 62-25. Regulations of Stormwater Discharge. Establishes guidelines for obtaining permits for general stormwater discharge, stormwater discharge for construction activities, and Wetland Stormwater Discharge Facilities.

Florida Administrative Code Chap. 62-620. Wastewater Facilities and Activities Permitting.

Florida Administrative Code Chap. 62-621.321(4). State Generic Permit for Storm Water Discharge from Construction Activities that Disturb 5 or More Acres of Land.

Florida Administrative Code Chap. 62-624. Municipal Separate Storm Sewer Systems.

Biological Resources

Animal Resources

16 USC 703 to 712, 1997-Supp, Migratory Bird Treaty Act (MBTA). Makes it illegal to take, kill, or possess migratory birds unless done so in accordance with regulations. An exemption may be obtained from the Department of the Interior for taking a listed migratory bird.

Threatened and Endangered Species

16 USC 668 to 668d, 1995, Bald and Golden Eagle Protection Act (BGEPA). Makes it illegal to take, possess, sell, purchase, barter, transport, export or import, at any time in any manner, any bald or golden eagle, unless done in accordance with regulations or permit conditions.

16 USC 1531 to 1544-16 USC 1536(a), 1997-Supp, Endangered Species Act 1973 (ESA). Federal agencies must ensure their actions do not jeopardize the continued existence of any endangered or threatened species or destroy or adversely modify the habitat of such species and must set up a conservation program.

50 CFR Part 402, 1996, Endangered Species Act - Interagency Cooperation. These rules prescribe how a Federal agency is to interact with either FWS or NMFS in implementing conservation measures or agency activities.

50 CFR Part 450, 1996, Endangered Species Exemption Process. Set forth the application procedure for an exemption from complying with Section 7(a)(2) of the ESA, 16 USC 1536(a)(2), which requires that federal agencies ensure their actions do not affect endangered or threatened species or habitats.

Air Force Policy Directive 32-70, 20-Jul-94, Environmental Quality. Develops and implements the Air Force Environmental Quality Program composed of cleanup, compliance, conservation, and pollution prevention. Implements Endangered Species Act.

Human Safety

29 CFR 1910.120, 1996, Occupational Safety and Health Act, Chemical Hazard Communication Program (OSHA). Requires that chemical hazard identification, information, and training be available to employees using hazardous materials and institutes material safety data sheets (MSDS), which provide this information.

Department of Defense Instruction 6055.1. Establishes occupational safety and health guidance for managing and controlling the reduction of radio frequency exposure.

Department of Defense Flight Information Publication. Identifies regions of potential hazard resulting from bird aggregations or obstructions and, military airspace noise-sensitive locations and defines airspace avoidance measures.

Air Force Instruction 32-2001, 16-May-94, The Fire Protection Operations and Fire Prevention Program. Identifies requirements for Air Force fire protection programs (equipment, response time, and training).

Air Force Instruction 32-7063, 1-Mar-94, Air Installation Compatible Use Zone Program (AICUZ). Defines and maps accident potential zones and runway clear zones around the installation and contains specific landuse compatibility recommendations based on aircraft operational effects and existing land use, zoning, and planned land use.

Air Force Manual 91-201, 12-Jan-96, Explosives Safety Standards. Regulates and identifies procedures for explosives safety and handling as well as defining requirements for ordnance quantity distances, safety buffer zones, and storage facilities.

Air Force Instruction 91-301, 1-Jun-96, Air Force Occupational and Environmental Safety, Fire Protection and Health (AFOSH) Program. Identifies occupational safety, fire prevention, and health regulations governing Air Force activities and procedures associated with safety in the workplace.

Habitat Resources

Executive Order 11990, 24-May-77, Protection of Wetlands. Requires federal agencies to minimize the destruction, loss, or degradation of wetlands and preserve and enhance the natural and beneficial values of wetlands in their activities. Construction is limited in wetlands and requires public participation.

Executive Order 11988, 24-May-77, Floodplain Management. Directs Federal agencies to restore and preserve floodplains by performing the following in floodplains: not supporting development; evaluating effects of potential actions; allowing public review of plans; and considering land and water resource use.

Air Force Policy Directive 32-70, 20-Jul-94, Environmental Quality. Develops and implements the Air Force Environmental Quality Program composed of cleanup, compliance, conservation, and pollution prevention. Implements Executive Orders 11988 and 11990.

Anthropogenic Resources

Hazardous Materials

42 USC 6901 et seq., 1980, Resource Conservation and Recovery Act of 1976 (RCRA) and Solid Waste Disposal Act of 1980. Subchapter III sets forth hazardous waste management provisions; Subchapter IV sets forth solid waste management provisions; and Subchapter IX sets forth underground storage tank provisions with which federal agencies must comply.

42 USC 9601 et seq., Public Law 96-510, 1997-Supp, Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended. Establishes the liability and responsibilities of federal agencies for emergency response measures and remediation when hazardous substances are or have been released into the environment.

42 USC 11001 to 11050, 1995, Emergency Planning and Community Right-to-Know Act (EPCRA). Provides for notification procedures when a release of a hazardous substance occurs; sets up community response measures to respond to a hazardous substance release; and establishes inventory and reporting requirements for toxic substances at all facilities.

42 USC 13101 to 13109, 1990, Pollution Prevention Act of 1990 (PPA). Establishes source reduction as the preferred method of pollution prevention, followed by recycling, treatment, then disposal. Establishes reporting requirements (for submittal with EPCRA reports). Federal agencies must comply.

Air Force Policy Directive 32-70, 20-Jul-94, Environmental Quality. Provides for developing and implementing an Air Force Environmental Quality Program composed of four pillars: cleanup, compliance, conservation, and

pollution prevention. Implements RCRA, EPCRA, PPA, and Executive Orders 12088, 12777, and 12586. Implements DoD Instruction 4120.14, DoD Directive 4210.15, and DoD Directive 5030.41.

Air Force Instruction 32-7080, 12-May-94, Pollution Prevention Program. Each installation is to develop a pollution prevention management plan that addresses ozone-depleting chemicals. EPA 17 industrial toxins, hazardous and solid wastes; obtaining environmentally friendly products energy conservation, and air and water conservation.

Cultural Resources

10 USC 2701 note, Public Law 103-139, 1997-Supp, Legacy Resource Management Program (LRMP). Provides funding to conduct inventories of all scientifically significant biological assets of Eglin AFB.

16 USC 431 et seq., Public Law 59-209, 34 Stat. 225, 43 CFR 3, 1906, Antiquities Act of 1906. Provides protection for archeological resources by protecting all historic and prehistoric sites on federal lands. Prohibits excavation or destruction of such antiquities without the permission (antiquities permit) of the secretary of the department with the jurisdiction over those lands.

16 USC 461 to 467, 1997-Supp, Historic Sites, Buildings and Antiquities Act (HAS). Establishes national policy to preserve, for public use, historic sites, buildings and objects of national significance. The Secretary of the Interior operates through the National Park Service to implement this national policy.

16 USC 469 to 469c-1, 1997-Supp, Archaeological and Historic Preservation Act of 1974 (AHPA). Directs federal agencies' to notify the Secretary of the Interior before starting construction of a dam or other project that will alter the terrain and destroy scientific, historical, or archeological data, so that the secretary may undertake preservation.

16 USC 470aa-470mm, Public Law 96-95, 1997-Supp, Archaeological Resources Protection Act of 1979 (ARPA). Establishes permit requirements for archaeological investigations and ensures protection and preservation of archaeological sites on federal property.

16 USC 470 to 470w-6-16 USC 470f, 470h-2, 1997-Supp, National Historic Preservation Act (NHPA). Requires Federal agencies to (1) allow the Advisory Council on Historic Preservation to comment before taking action on properties eligible for the National Register and (2) preserve such properties in accordance with statutory and regulatory provisions.

25 USC 3001 to 3013, (Public Law 101-601, 1997-Supp, Native American Graves Protection and Repatriation Act of 1990 (NAGPRA). Federal agencies must obtain a permit under the Archeological Resources Protection Act before excavating Native American artifacts. Federal agencies must inventory and preserve such artifacts found on land within their stewardship.

42 USC 1996, 1994, American Indian Religious Freedom Act (AIRFA). Federal agencies should do what they can to ensure that American Indians have access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites in the practice of their traditional religions.

32 CFR Part 200, 1996, Protection of Archaeological Resources: Uniform Regulations. Provides that no person may excavate or remove any archaeological resource located on public lands or Indian lands unless such activity is conducted pursuant to a permit issued under this part or is exempted under this part.

36 CFR Part 60, 1996, Nominations to National Register of Historic Places. Details how the federal agency preservation officer is to nominate properties to the Advisory Council for consideration to be included on the National Register.

36 CFR Part 800, 1995, Protection of Historic and Cultural Properties. Sets out the Section 106 process for complying with Sections 106 and 110 of the NHPA. The Agency official, in consultation with the state historic preservation officer (SHPO), identifies and evaluates affected historic properties for the Advisory Council.

Executive Order 11593, 16 USC 470, 13-May-71, Protection and Enhancement of the Cultural Environment. Instructs federal agencies to identify and nominate historic properties to the National Register, as well as avoid damage to historic properties eligible for the National Register.

Executive Order 13007, 24-May-96. Directs federal agencies to provide access to and ceremonial use of sacred Indian sites by Indian religious practitioners as well as promote the physical integrity of sacred sites.

DoD Directive 4710.1, Archaeological and Historic Resources Management (AHRM). Establishes policy requirements for archaeological and cultural resource protection and management for all military lands and reservations.

Air Force Policy Directive 32-70, 20-Jul-94, Environmental Quality. Develops and implements the Air Force Environmental Quality Program composed of cleanup, compliance, conservation, and pollution prevention. Implements National Historic Preservation Act, Executive Order 11593, and DoD Directive 470.1.

Air Force Instruction 32-7065, 13-Jun-94, Cultural Resource Management. Directs Air Force bases to prepare cultural resources management plans (CRMPs) to comply with historic preservation requirements, Native American considerations, and archeological resource protection requirements, as part of the Base Comprehensive Plan.

Air Force Policy Letter, 4-Jan-82. Establishes Air Force policy to comply with federal historic preservation and environmental laws and directives.

APPENDIX B

GEOMORPHOLOGY

GEOMORPHOLOGY

Soil Series

The following soils that occur at the proposed D-51 South, LZ East, and Base Tango training areas are identified as soil associations or individual soil series. D-51 South and LZ East soil series and soil moisture regimes are presented in Figures B-1 through B-4. A soil association is a group of soils that are geographically associated in a characteristic repeating pattern and defined and delineated as a single soil-mapping unit. In many instances, the individual soil series that comprise an association are too intricately mixed or too small to be identified or mapped separately. Soil series are soils that have profiles that are almost alike, except for differences in texture, the surface layer, or composition of underlying materials. Typically a soil association is comprised of two or more soil series.

D-51 South Soil Series

Upland Soils

Upland soils are generally classified as soils with an udic soil moisture regime.

Chipley Sand (0 to 5 percent slopes)

The Chipley series consists of very deep, moderately well-drained or somewhat poorly drained, rapidly permeable soils that formed in thick deposits of sandy marine sediments on uplands in the lower Coastal Plain. The soil frequently occurs in association with the Hurricane soil series. Texture is sand or fine sand to depths of 80 inches or more. Silt plus clay content between depths of 10 and 40 inches is 5 to 10 percent. Reaction ranges from extremely acid to moderately acid in the A horizon except where limed and from very strongly acid to slightly acid in the C horizon.

Eglin Sand (0 to 5 percent slopes)

The Eglin series consists of very deep, somewhat excessively drained soils that formed in thick sandy marine sediments. Eglin soils are on nearly level to gently sloping broad upland landscapes on relatively low elevations within the sandhills commonly near the heads of drainageways. The water table fluctuates briefly between depths of 60 to 80 inches during periods of high rainfall. Runoff is low and permeability is rapid in the surface and subsurface layer and moderate to moderately rapid in the subsoil. The solum is greater than 80 inches thick. Soil reaction is very strongly acid or strongly acid in all layers. Texture is sand or fine sand throughout.

Foxworth Sand (0 to 5 percent slopes)

The Foxworth series consists of very deep soils that formed in sandy marine or eolian sediments. These soils are on broad, nearly level and gently sloping uplands and sloping to steep side slopes leading to drainageways. Runoff is very slow and permeability is rapid or very rapid. A water

table fluctuates between depths of 48 to 72 inches below the soil surface for 1 to 3 months during most years and 30 to 48 inches for less than 30 cumulative days in some years. Thickness of sand exceeds 80 inches. Reaction ranges from very strongly acid to slightly acid throughout. Texture is sand or fine sand throughout, and silt plus clay content in the control section is 5 to 10 percent.

Hurricane Sand (0 to 5 percent slopes)

The Hurricane series consists of very deep soils that formed in sandy marine sediments. These soils are on nearly level to gently sloping, low, broad landscapes that are slightly higher than the adjacent flatwoods of the Lower Coastal Plain. Hurricane soils are somewhat poorly drained. Runoff is slow and permeability is very rapid or rapid in the A and E horizons and moderately rapid in the Bh horizon. A water table is at depths of 2 to 3.5 feet for 3 to 6 months during most years and at depths greater than 3.5 feet the remainder of the time. Some areas are subject to flooding for brief periods. The solum is 60 inches or more thick. Reaction ranges from moderately acid to extremely acid throughout.

Lakeland Sand (0 to 12 percent slopes)

This sandy, very deep, excessively drained, rapidly permeable soil formed in sandy marine, fluvial, and/or eolian sediments. This soil typically contains 95 percent or more quartz or other insoluble minerals and is loose and incoherent and less than 1 percent organic matter. Lakeland sand has a rapid infiltration rate and is very highly permeable (20 to 28 inches per hour). Collectively, these properties are consequential to soil formation, structure, and productivity and define thresholds beyond which damage can occur. The resulting condition of a typical Lakeland soil is generally characterized as excessively drained; poor soil structure (low cohesion, adhesion, and aggregate stability); very low fertility; very high leaching potential; relatively low diversity, activity, and populations of soil microbes (bacteria, actinomycetes, fungi, algae, protozoa), arthropods, and earthworms; and absence of active soil-forming processes. These soils do not have a water table within a depth of 80 inches.

Wetland Soils

Wetland soils are generally classified as soils with an aquic soil moisture regime.

Dorovan-Pamlico Association (0 to 1 percent slopes)

This soil association occurs primarily along the floodplains of Eagle, Piney, and Little Trout Creeks and is frequently flooded. The soil series that comprise this association are described in the following sections.

Dorovan Series

The Dorovan series consists of very poorly drained, moderately permeable soils on densely forested flood plains, hardwood swamps, and depressions of the Coastal Plains. They formed in highly decomposed acid-organic materials. The organic material ranges from 51 to more than 80 inches thick. It is extremely acid or very strongly acid in the organic layers. It is strongly acid or

very strongly acid in the C horizon. The soil is saturated to the surface most of the time. Runoff is very slow and water is ponded on the surface in depressions. The underlying mineral sediments commonly are loamy or sandy and are very strongly acid or strongly acid.

Pamlico Series

The Pamlico series consists of very poorly drained soils that formed in decomposed organic material underlain by dominantly sandy sediment. The soils are on nearly level flood plains, bays, tributaries of major streams, and depressions of the Coastal Plain. Runoff is very slow and flooding is rare to frequent. Permeability is moderate to moderately rapid in the organic layers and slow to very rapid in the mineral layers. Pamlico soils have 16 to 51 inches of organic material over dominantly sandy sediments. Reaction is extremely acid in the organic layers and ranges from extremely acid to strongly acid in the underlying mineral layers.

LZ East Soil Series

Upland Soils

Bonneau-Norfolk-Angie Complex (5 to 12 percent slopes)

This soil association occurs on sloping to strongly sloping land, is well drained, and is prone to erosion. A description of the soil series that compose the soil complex are discussed in the following sections.

Bonneau Series

The Bonneau series consists of very deep soils that formed in loamy marine sediments on nearly level to strongly sloping low ridges of the Coastal Plain. These soils are well drained to somewhat excessively drained with slow runoff and moderate permeability. On the sloping areas of these soils, wetness is the result of lateral seepage instead of an apparent high water table. Solum thickness ranges from 60 to more than 80 inches. The soil is extremely acid to slightly acid in the A and E horizons and extremely acid to moderately acid in the Bt horizon. Content of silt in the particle-size control section is less than 30 percent.

Norfolk Series

The Norfolk series consists of very deep soils that formed in medium to moderately fine textured loamy marine sediments of the Coastal Plain gently sloping uplands. Norfolk series soils are well drained, have slow to medium runoff, and are moderately permeable. These soils have a seasonally apparent water table at depths of 4.0 to 6.0 feet. Solum thickness is more than 60 inches. Few to about 5 percent small rounded siliceous pebbles are on the surface and throughout the soil in some pedons. A few fine or medium rounded ironstone pebbles are present in some pedons. Reaction is strongly acid to extremely acid, except where limed. Mottles, associated with seasonal wetness, range from about 48 to 72 inches below the surface.

Angie Series

The Angie series consists of very deep soils that formed in loamy and clayey sediments on broad, level to strongly sloping Tertiary-aged uplands. Angie soils are moderately well drained, slowly permeable soils; runoff is medium to rapid. The water table is at a depth of 2 to 5 feet during winter and early spring. Solum thickness ranges from 60 to 90 inches. Reaction ranges from very strongly acid to slightly acid in the A and E horizons. Ironstone or quartz gravel range from none to common throughout the solum.

Chipley Sand (0 to 5 percent slopes)

See previous section.

Fuquay Loamy Sand (5 to 8 percent slopes)

The Fuquay series consists of very deep soils that formed in sandy and loamy marine sediments on nearly level to sloping uplands of the upper Coastal Plain. These soils are well drained and have a perched water table occurring above the plinthic zone briefly during wet periods. Internal drainage is medium. Permeability is rapid in the A and E horizons, moderate in the Bt horizon, and slow in the Btv horizon. Solum thickness exceeds 60 inches. Reaction is very strongly acid to moderately acid throughout except where limed. Typically, a few rounded nodules of ironstone are on the surface and throughout the A, E, BE, and Bt horizons.

Florala Loamy Fine Sand (2 to 5 percent slopes)

The florala series consists of very deep soils that formed in loamy marine or fluvial sediments on broad ridges and side slopes of uplands and stream terraces. This soil is somewhat poorly drained, slow to very slowly permeable. Solum thickness exceeds 60 inches. Reaction is very strongly acid or strongly acid throughout the soil

Lakeland Sand (0 to 12 percent slopes)

The Lakeland sand soil covers about 490 acres, which is about 50 percent of the LZ East training area. See previous section for a description of Lakeland Sand.

Leefield-Stilson Loamy Sands (0 to 5 percent slopes)

This soil occurs on nearly level to gently sloping, somewhat poorly drained and moderately well drained seepage slopes and low flats. Wetland inclusions may occur within this soil.

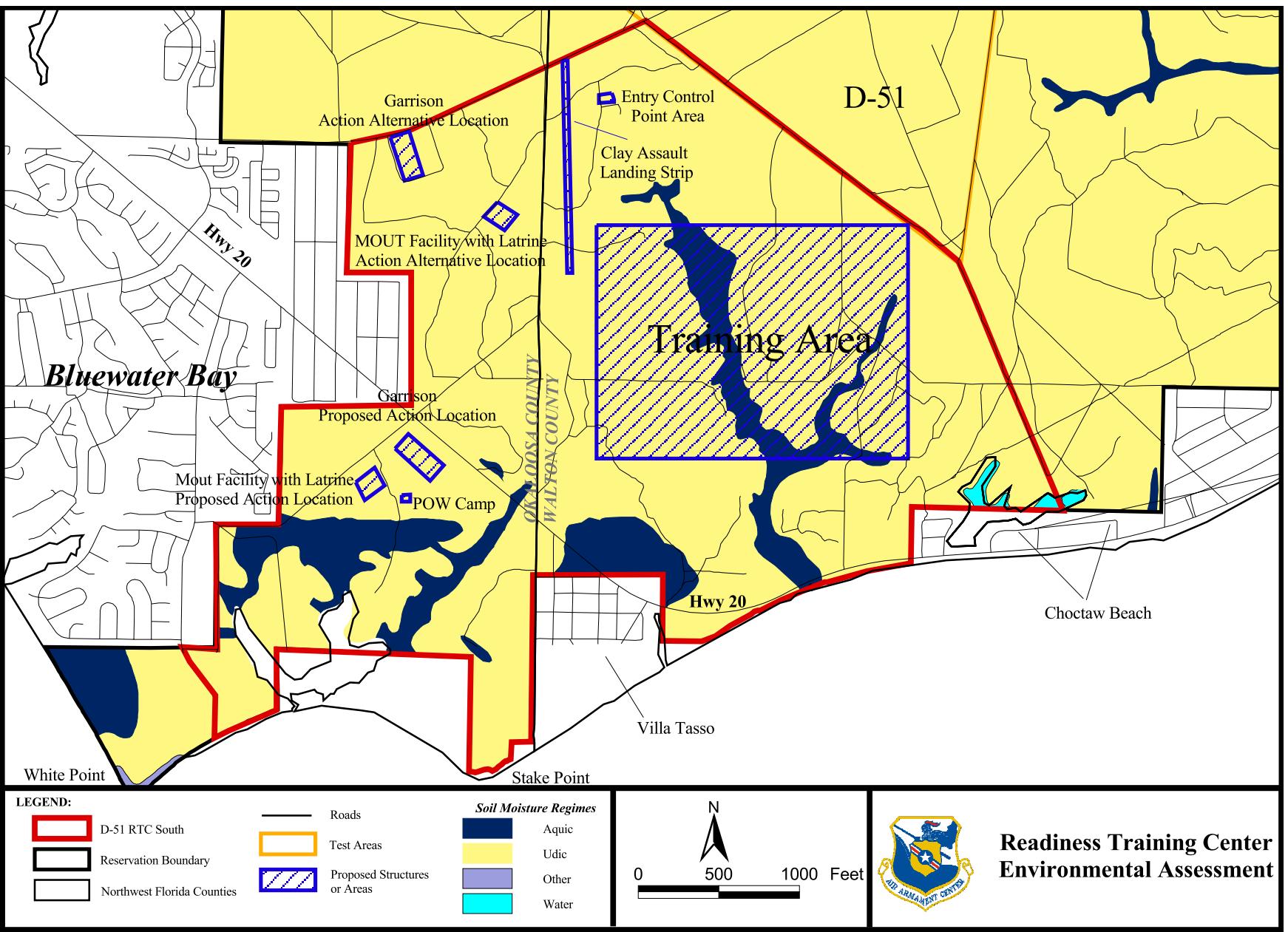


Figure B-1. D-51 South Soil Moisture Regimes

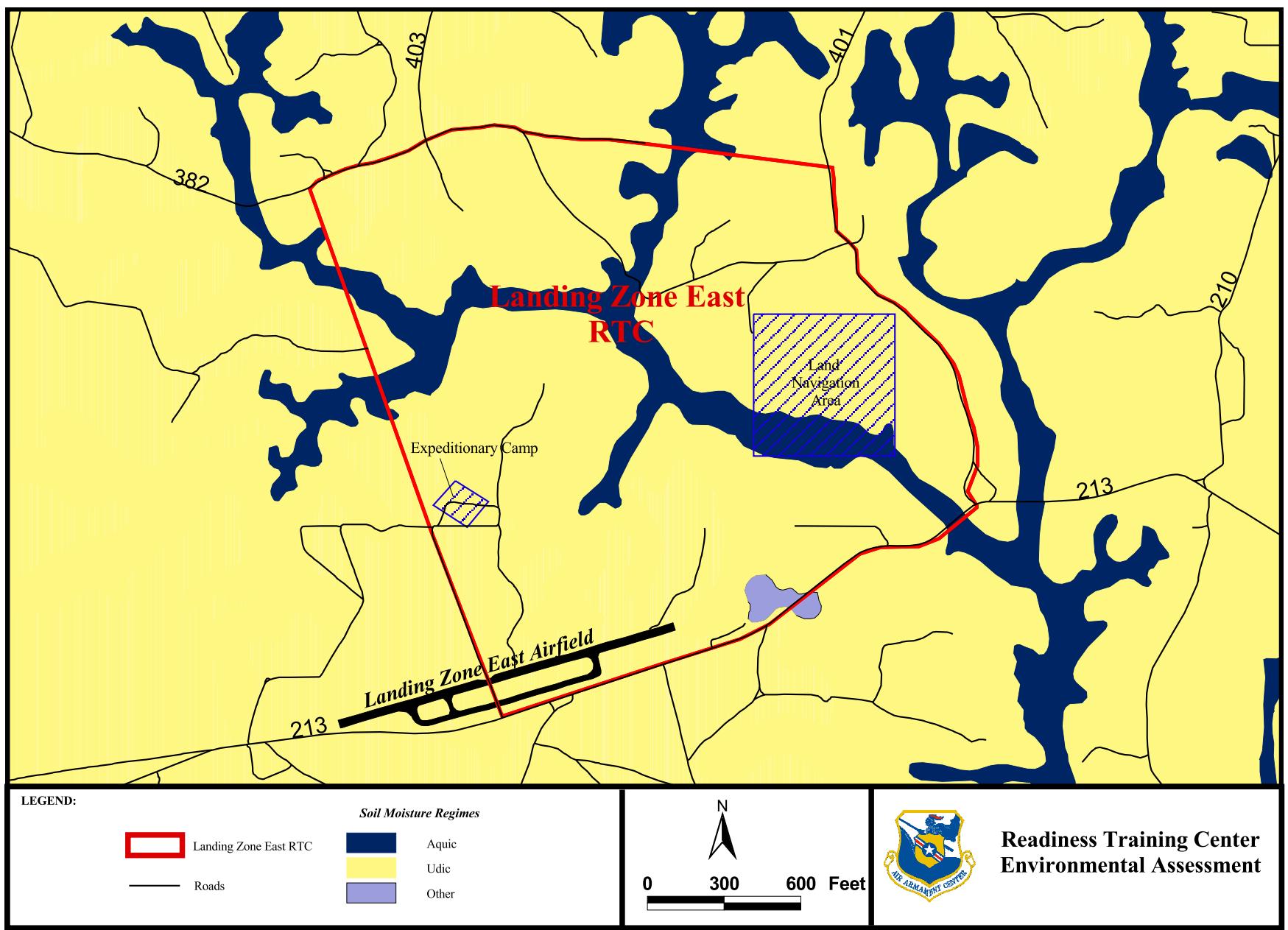
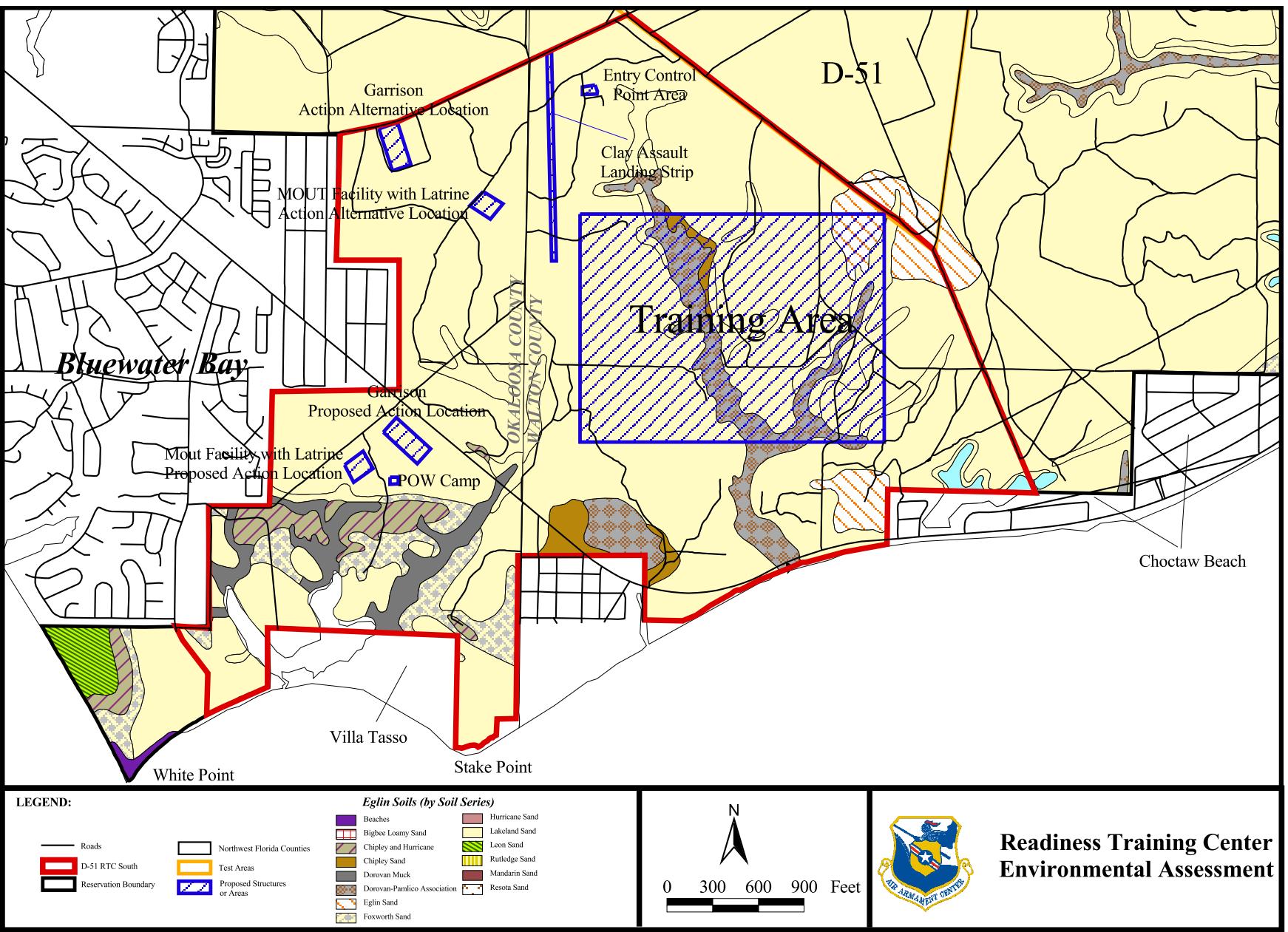
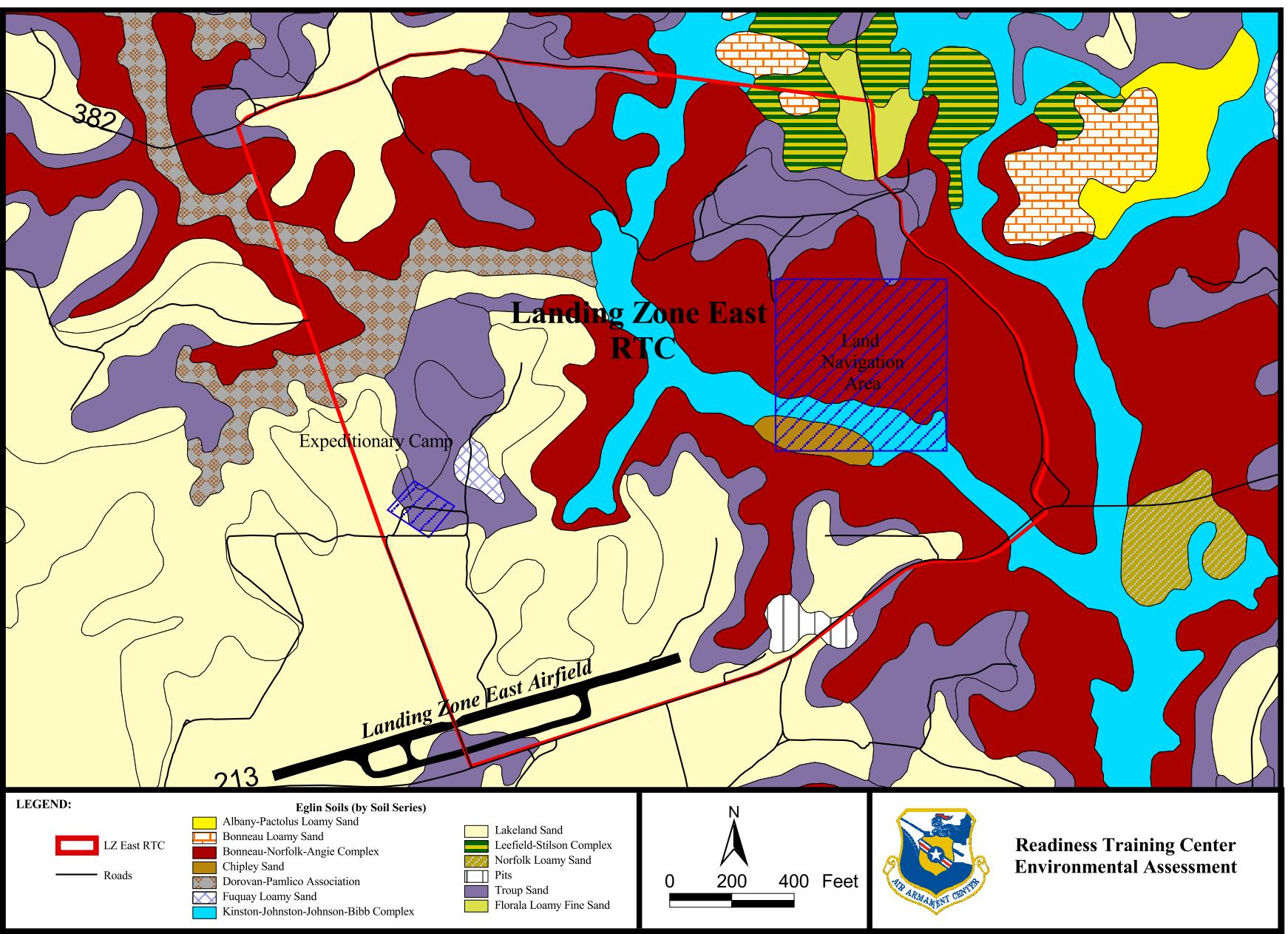


Figure B-2. LZ East Soil Moisture Regimes





Leefield Series

The leefield series consists of very deep soils that formed in deposits of sandy and loamy sediments, largely of marine origin on gently sloping uplands of the coastal plain. Leefield soils are moderately well drained and somewhat poorly drained and exhibit slow runoff. Permeability is rapid in the surface and subsurface layers, and moderately slow in the lower part of the subsoil. Solum thickness ranges from 60 to 90 inches or more. Reaction ranges from strongly acid to very strongly acid, except where limed. Ironstone nodules 2 to 15 mm in size range from 0 to 5 percent by volume. The sandy epipedon is 20 to 30 inches thick in most pedons but ranges from 20 to 40 inches thick.

Stilson Series

The stilson series consists of very deep soils that formed in thick beds of sandy and loamy marine sediments. This soil is moderately well drained and moderately permeable. Solum thickness ranges from 60 to 90 inches. Content of weakly and strongly cemented ironstone nodules ranges from 0 to 5 percent throughout the profile. Reaction is very strongly acid or strongly acid throughout the profile.

Troup sand (0 to 25 percent slopes)

The troup series consists of deep, somewhat excessively drained soils with thick sandy surface and subsurface layers and loamy subsoils. They formed in nearly level to steep unconsolidated sandy and loamy marine sediments on coastal plain uplands. Runoff is slow and permeability is moderate in the *bt* horizon and rapid in the *a* and *e* horizons. Solum thickness is more than 80 inches. Reaction of the surface and subsurface layers ranges from very strongly acid to medium acid, except where limed, and from very strongly acid to strongly acid in the subsoil. Percent by volume of quartz gravel and ironstone nodules ranges up to 10 percent in the solum.

Wetland Soils

Dorovon-Pamlico Association

This soil association occurs primarily along the floodplain of Alaqua Creek and Live Oak Branch and is frequently flooded. See previous section for a discussion of the Dorovon and Pamlico soil series.

Kinston-Johnston-Bibb Association (0 to 2 percent slope)

This soil association primarily occurs along the floodplain of Alaqua Creek and Buck Branch and is frequently flooded.

Kinston Series

The Kinston series consists of very deep, poorly drained, moderately permeable soils that formed in stratified loamy and sandy recent alluvium. These soils are on flood plains on the Middle Coastal Plain. Runoff is slow or ponded. These soils are flooded a few to several times each

year and the water table is within 10 inches of the surface during periods of high rainfall. The loamy sediments range from 40 to 60 inches or more over gravel that is stratified with loamy and sandy material. Organic carbon content decreases irregularly to depths of 50 inches. Dark concretions are common in some pedons. The soils are strongly acid or very strongly acid except for surface layers that have been limed.

Johnston Series

The Johnston series consists of very deep, very poorly drained, nearly level floodplain soils that formed in dominantly loamy recent alluvium along streams. This soil is very poorly drained and runoff is very slow. The permeability is moderately rapid in the A horizon and rapid in the Cg horizon. These soils are flooded a few to several times each year, and the water table is within 10 inches of the surface during periods of high rainfall. The soils are strongly acid or very strongly acid except for surface layers that have been limed.

Bibb Series

The Bibb series consists of very deep, poorly drained, moderately permeable soils that formed in stratified loamy and sandy alluvium of stream floodplains. This soil is commonly flooded and water runs off the surface very slowly. The water table is within 8 inches of the surface from 6 to 11 month each year. The soils are extremely acid to strongly acid throughout the profile.

APPENDIX C

PLANT COMMUNITIES

PLANT COMMUNITIES

Upland Communities

Over time there have been numerous shifts in the relative dominance of pine and hardwoods on the Eglin landscape. One of the most far-reaching impacts to pine ecosystems has been the suppression of fire. In the absence of fire, the fire climax longleaf pine communities typically succeed to a xeric hammock dominated by oaks and other hardwoods (Murphy and Nowacki, 1997). Physical disturbances to ground cover or the canopy can also result in degradation of the site by the invasion of native plants uncommon in natural situations but adapted to disturbed sites or exotic nonnative species. The Eglin pine ecosystems are categorized as sandhills and flatwoods.

Upland Pine Sandhills

The sandhills land type covers approximately 78 percent of the Eglin reservation and is characterized as rolling sandhill ridges dissected by streams. The overall condition of the sandhills varies from relatively undisturbed to heavily modified. Over the extent of their total presettlement range in the southeast, the Longleaf Pine-Wiregrass associations have been reduced by as much as 98 percent (Noss, 1989).

The sandhills typically occur on deep, sandy Lakeland soils characterized by relatively flat to steeply sloped ridges, hilltops, gently rolling hills, and stream terraces. Loamy sands, sandy loams, loamy clay, and muck soils are found in lower lying areas. The dry environment created by the sandy soils is accentuated by the absence of a closed longleaf pine overstory canopy. Sunlight readily penetrates the scattered overstory, which warms the ground during the day, increases the rate of cooling at night, and reduces air moisture retention. The sandy soils make the sandhills important to aquifer recharge by allowing water to quickly infiltrate the surface with little runoff and evaporation (Wolfe et al., 1988). Small amounts of scrub, hammock, flatwoods, dome swamp, depression marsh, and bottomland hardwoods interlace the sandhill plant communities. The sandhills are categorized as longleaf pine sandhills and sand pine sandhills.

Longleaf Pine Sandhills

The Longleaf Pine Sandhills (LPS) are described as a forest of widely spaced overstory (35 to 45 percent canopy cover in high quality sites) of longleaf pines (*Pinus palustris*), a sparse midstory of xeric oaks and other hardwoods, and a dense understory of grasses, forbs, and ferns on rolling hills of sand. The LPS is a fire subclimax community that is dependent on frequent fire events to restrict hardwood competition and promote the dominance of longleaf pines and grasses such as wiregrass (*Aristida stricta*).

Most longleaf pine growth during the first five years is concentrated in the roots, which enables it to survive even when the leaves are consumed by fire. However, hot fires resulting from heavy litter accumulation can kill longleaf pines. In virgin old-growth stands, one surviving seedling every 5 to 10 years could be enough to maintain a fully stocked stand. Large-scale

reduction in fire regimes has resulted in dramatic declines in this plant community. Without frequent fires every 2 to 5 years, the LPS normally succeed to a xeric hammock dominated by scrub oaks (*Quercus* spp.), live oaks (*Quercus virginiana*), and southern magnolia (*Magnolia grandiflora*).

The LPS community is primarily comprised of a midstory of xerophytic hardwood trees such as southern magnolia, live oak, persimmon (*Diospyros virginiana*), sparkleberry (*Vaccinium arboreum*), winged sumac (*Rhus copallina*), and scrub oaks including turkey oak (*Quercus laevis*), bluejack oak (*Quercus incana*), and sand post oak (*Quercus margareta*). Although tree species diversity is relatively low, there is a wide variety of understory herbaceous plants such as wiregrass, Indiangrass (*Sorghastrum nutans*), wild buckwheat (*Eriogonum tomentosum*), small fruit beggarticks (*Bidens mitis*), showy partridge pea (*Chamaecrista fasciculata*), yellow foxglove (*Agalinis* spp.), milk pea (*Galactia* spp.), queen's delight (*Stillingia sylvatica*), bracken fern (*Pteridium aquilinum*), dollarweeds (*Rhynchosia reniformis*), wild indigo (*Indigofera spicata*), gopher apple (*Licania michauxii*), golden-aster (*Chrysopsis* spp.), and other plants that provide fairly complete ground cover.

A high-quality LPS community (Tier I) typically contains multiple age classes of pines showing a wide range of diameter at breast height (dbh) classes and regeneration stages including old growth (100+ years) or older mature (50+ years) native pine trees forming an open canopy. High-quality Tier I communities exhibit portions of vegetative associations that are in or closely approximate their natural state (FNAI, 1994). A Tier I LPS community indicates a high-quality site for federally listed threatened and endangered species.

Sand Pine Sandhills

Logging and fire suppression played a major role in the succession of the Eglin reservation LPS to plant communities dominated by encroaching sand pine. The majority of the sand pine sandhill (SPS) is made up of closed canopy, 60 plus year old sand pine that has shaded out other vegetation and substantially reduced ground cover. Longleaf pine is scattered and the understory is normally dominated by turkey oak and live oak. Stand openings are quickly occupied by regenerating clumps of sand pine.

Approximately 700 acres have been artificially reforested from 1972 and 1979 and 750 acres have been cut for natural sand pine regeneration since 1977. There are areas of unique old growth sand pine that may closely resemble the natural state of the SPS vegetation community. The area of oldest sand pine will be maintained as an SPS forest with limited seed tree cutting. A study will be conducted to determine the significance of the old growth SPS forest. Pending study findings, a determination would be made as to portions of the SPS that could be converted to LPS forest.

Mesic Pine Flatwoods

These ecosystems occur on flats or terraces and have flat to gently sloping topography. The soils are generally acidic, low fertility, poorly drained fine sandy loam, silt loam, or sandy soils with varying clay content. Soil may be saturated for extended periods of time and may also dry out during summer months. Most flatwoods are dependent on low-intensity fires every one to three

years for their continued existence. In the absence of fire, flatwoods may succeed to mixed hardwoods or bayheads.

Flatwoods on Eglin are classified as mesic, wet, and scrubby. The mesic flatwoods are the most widespread and are characterized by widely spaced pines and a dense ground cover of grasses and herbs including wiregrass (*Aristida stricta*), saw palmetto (*Serenao repens*), gallberry (*Ilex glabra*), St. Johns wort (*Hypericum cistifolium*), and dwarf wax myrtle (*Myceria pumila*). Midstory components are minimal or nonexistent. Indicators of degradation in flatwoods communities include winged sumac (*Rhus copallina*), blackberry (*Rubus spp.*), and rush (*Juncus polyccephalus*).

Upland Mixed Forest

The Upland Mixed Forest (UMF) is characterized by widely spaced pine trees on rolling hills with diverse grass and herb ground cover and a sparse shrub layer. Soils consist of sand over Miocene clay substrates. The subsoil mesic conditions, created by the moisture retaining clay layer, allows plants typically found in wet low areas to persist on upland sites. Most sites have diverse ground cover, open midstory, and dense, relatively even-aged second-growth pine overstory.

Based on the potential natural vegetation in the absence of fire, typical trees include longleaf pine, southern red oak (*Quercus falcate*), running oak (*Quercus pumila*), sand post oak, bluejack oak, flowering dogwood (*Cornus florida*), and persimmon. Fire plays a key role in maintaining the UMF community. Fire exclusion normally favors slash pine over longleaf pine. However, the two species may occur together on sites where fire has been absent for 5 to 10 years. Without fire, hardwoods become dominant. Prescribed burning is normally conducted in summer and winter to reduce fuel loading and restore and maintain ecosystem components.

Most hardwoods are relatively intolerant to fire. Fires can cause a cat-face on the trunk that allows diseases and insects to attack the tree, promoting decay. Many species such as American beech can sprout following fire but are prone to decay. Southern magnolia is normally top-killed by fire but can resprout. White oak is moderately resistant to fire and can resprout; it needs periodic fire to perpetuate because it is shade intolerant. Sweetgum is more susceptible to summer fires than winter, but it does resprout after a fire.

Longleaf, slash, and/or loblolly pine thinnings are conducted for timber production, improving red-cockaded woodpecker habitat, and maintaining a higher diversity of age classes and stand structure. The use of summer fires to control sand pine encroachment, hardwood encroachment of seepage slopes, and reduce wiregrass duff to stimulate the growth of sensitive species has become more frequent since 1990.

Upland Hardwood Forest

The closed canopy, well developed hardwood community of the upland hardwood forest (UHF) is typically composed of hardwood species such as laurel oak (*Quercus hemisphaerica*), white oak (*Quercus alba*), Arkansas oak (*Quercus arkansana*), pignut hickory (*Carya glabra*), sand hickory (*Carya pallida*), southern magnolia (*Magnolia grandiflora*), basswood (*Tilia Americana*),

American beech (*Fagus grandfloria*), tuliptree (*Liriodendron tulipifera*), sourwood (*Oxydendron arboreum*), eastern hophornbeam (*Ostrya virginiana*), American holly (*Ilex opaca*), and two-wing silverbell (*Halesia diptera*). These communities often grade into pine sandhills, upland mixed forests, and xeric hammocks. Disturbed UHFs may require hundreds of years to develop to a form that is representative of climax species composition. UHFs in Walton County generally occur on Bonneau-Norfolk-Angie Complex soils with high amounts of loam and clay that are primarily found along slopes and streamheads. The udic soil moisture regimes created by this soil type creates a localized soil environment that favors the establishment and growth of hardwood plant communities. The UHF is the climax community for its respective geographic location (FNAI, 1997).

Xeric Hammock

The xeric hammock (XH) occurs as a scrubby, dense, low canopy forest with little understory other than palmetto or a multi-storied forest of tall trees with an open or closed canopy. Typical tree species include live oak (*Quercus virginiana*), sand live oak (*Quercus geminata*), laurel oak, turkey oak (*Quercus laevis*), and sand post oak (*Quercus margareta*). Xeric hammocks generally occur in relatively small isolated patches. This community represents an advanced successional stage of scrub or sandhill. Soils that support these communities are deep, excessively-drained sands derived from old dune systems. Xeric hammocks only develop on sites that have been protected from fire for 30 or more years. The sparse herb layer and the relative incombustible nature of the oak litter prevent most fire invasions; however, when fire does occur it is normally catastrophic and results in replacement with another community type. Mature examples of xeric hammocks are rare with scrub derived types being especially rare (FNAI, 1997).

Scrub

Scrub vegetation occurs on dunes along coastlines and on inland deep, excessively-drained white quartz sandy soils associated with ancient shorelines.

Wetlands

Wetland community types discussed in this section include baygalls (steephead baygall and blackwater stream baygall), floodplain/bottomland complex (floodplain swamp, floodplain forest, and bottomland hardwoods), seepage slopes, depression marsh, and swamp lakes. Many of the wetland systems examined in this analysis are associated with the unique features of steephead seepage streams.

Baygalls

Baygalls are highly variable wetland communities composed of broadleaved evergreen trees and shrubs and occur within Eglin steepheads, flatwoods, and blackwater stream margins. This type of wetland generally occurs as a densely forested, acidic wetland dependent on a continuous seepage flow or high water table. Fourteen species of rare plants have documented to occur in Eglin baygall systems. Baygalls are fire-maintained systems that require periodic fire; otherwise woody species dominate, increasing shade and decreasing available moisture, which influences

the occupancy of other species. Fire is also instrumental in maintaining system-specific moisture regimes and evapotranspiration rates (FNAI, 1997; Litt et al., 2000).

Several sensitive wildlife species utilize baygall habitats including the state listed Florida bog frog (*Rana okaloosa*) and federally threatened Eastern indigo snake (*Drymarchon corais couperi*). The small, shallow, slow-flowing groundwater seepage rivulets that characterize baygalls provide ideal egg laying habitat for the bog frog (species of special concern). The relatively constant, shallow, low-flow conditions also provide areas for larvae development. Indigo snakes may use baygall type wetland habitats from August through November.

Steephead Baygall

The steephead baygall or the Florida anise (*Illicium floridanum*) baygall is generally restricted to the bottom of steepheads at the origin or along the stream margins. Typical canopy species, including sweet bay (*Magnolia virginiana*), swamp bay (*Persea palustris*), black titi (*Cyrilla racemiflora*), buckwheat tree (*Cliftonia monophylla*), and netted-chain fern (*Woodwardia areolata*), help maintain cool and humid conditions. Sensitive species that occur in steephead baygalls include the bog spice bush (*Lindera subcoriacea*), Florida anise (*Illicium floridanum*), sweep pitcher plant (*Sarracenia rubra*), spoon-leaved sundew (*Drosera intermedia*), and spoon-flower (*Peltandra sagittifolia*) (FNAI, 1997).

Blackwater Stream Baygall

Baygalls also occur along the margins of blackwater streams usually below steepheads. What distinguishes this system is the presence of Atlantic white cedar (*Chamaecyparis thyoides*) and pond cypress (*Taxodium ascendens*). These areas appear to be dependent on cool, flowing water. Typically the canopy is more open than the steephead bagall, which increases the diversity of groundcover species. Sensitive species that occur in blackwater stream baygalls include the panhandle lilly (*Lilium iridollae*), hairy-peduncled beakrush (*Rhynchospora crinipes*), spoon flower (*Peltandra sagittifolia*), white-top pitcher plant (*Sarracenia leucophylla*), sweep pitcher plant (*Sarracenia rubra*), and spoon-leaved sundew (*Drosera intermedia*). The baygall substrate is partly composed of sphagnum moss (*Sphagnum spp.*) which helps maintain a moist to wet, acidic, mucky soil. One hundred sixty-four total plant taxa have been documented to occur in these ecosystems (FNAI, 1997; Litt et al., 2000).

Seepage Slopes

One of the most rare, unique, diverse assemblages of plants and particularly carnivorous plants in the world occurs within the seepage slopes of the southeastern United States. These seepage slopes are generally confined to the Lower Gulf Coast Plain from the Apalachicola River in the east to the Tangipahoa River in the west and up to 100 kilometers inland. Pitcher plant diversity and abundance are highest within the seepage slopes of the Florida Panhandle. While more than 100 plant species have been identified in these environments, the plant species diversity in Panhandle seepage slopes has been as high as 300 species, which makes Panhandle seepage slope bogs one of the single most rare and unique ecosystems in the world (Wolfe et al., 1988).

Eglin seepage slopes are primarily associated with the clayey soils of the upland Pine Sandhills in the northeastern portion of the reservation. The seepage slope is a unique and high priority natural community on Eglin. The Eglin AFB Natural Resources Division has identified the protection of seepage slopes as an Eglin Conservation target; it ranks fourth in order of importance on the list of communities (U.S. Air Force, 2001a).

A seepage slope bog or pitcher plant bog is a small, grass/sedge/forb dominated wetland occurring along a gentle slope intersection of the horizontal water table over a broad area. Seepage slopes primarily form in Eocene to Holocene age materials along hillsides or in bowl shaped depressions. They occur on slopes with constant seepage from a perched water table where the ground is saturated but rarely inundated. Subsurface clay layers restrict downward percolation and create lateral groundwater flows that emerge at mid to lower slope positions and create saturated soil conditions. The water produced by hillside seeps flow gently downslope over the surface. Seepage slopes communities normally occur on slopes of less than 20 percent and, in some instances, the slope is barely discernable with the human eye.

Although defined as wetlands, seepage slope bogs can experience soil moisture gradient extremes. During periods of wet weather, seepage is normally continuous, which keeps the soil saturated; however, during droughts the soil may become quite dry. Typically, soils are nutrient poor, acidic, loamy sands with high organic content. The organic layers that accumulate on the surface vary from a few inches to several feet thick. Seepage slopes are characterized by high acidic pH that generally ranges from 3.5 to 5.0. Species that persist in seepage slope habitats have adaptations to low nutrient soils and drastic changes in soil moisture that give them a competitive edge over other species. Seepage slopes frequently contain a diversity of wetland plants including a number of carnivorous species such as pitcher plants (Wolfe et al., 1988; Studenroth, 1994).

The primary threat to the existence of seepage slopes is loss of habitat due to anthropogenic soil disturbances, fire suppression and ecological succession, plant collecting, and introgressive hybridization. Direct disturbance of seepage slope bog soils or inundation by sediment can alter hydrology enough to cause a shift in dominant vegetation. Fire exclusion causes the encroachment of shrubs that shade out diverse forbs causing an eventual shift to a baygall community. Feral hogs are particularly destructive within seepage slopes, which are used as wallows. They uproot vegetation, creating barren patches that limit the spread of fire in these systems. It is estimated that **97 percent** of the Gulf Coast's seepage slopes have already been lost (Studenroth, 1994).

A seepage slope bog wetland has been identified near the north boundary of the proposed LZ East training area (Figure C-1). No seepage slopes were identified to occur within the realm of influence of D-51 South or Base Tango.



Figure C-1A. Seepage Slope Savannah



Figure C-1B. Yellow trumpet pitcher plants

Figure C-1. LZ East Seepage Slope Savanna

Swamp Lake

Swamp lakes are a product of nature's most proficient hydrologic engineers, the beaver (*Castor canadensis*). In many instances, beaver ponds are created upstream of culverts because of the sounds generated by falling water. Beaver activity can cause damage to drier forest types as well as near-permanently flooded swamp forest types by increasing flooding. Raised water levels and stagnant floodwaters can reduce the growth of bottomland hardwoods and kill other less tolerant species. Timber resources may be damaged or killed by girdling that occurs during feeding.

Floodplain Complex

Floodplains are biologically unique and highly diverse ecosystems, providing a rich diversity of aquatic and terrestrial species and acting as a functional part of natural systems. The driving factor of floodplains is the duration and frequency of flooding events. Alluvial plain flooding depends on the size and slope of the watershed together with soil and slight elevation changes within the floodplain that creates a high degree of potential variability in community composition and function. In many cases, a slight elevation change measured in inches may be sufficient to alter hydrology sufficiently to result in a successional transition to a different plant community.

Stream and river corridors are frequently used as flyways for migrating birds, and floodplain vegetation provides important resting, feeding, and nesting areas for many waterfowl species. However, fragmentation of continuous natural areas reduces their appeal and function for a wide variety of wildlife species. Floodplains also provide habitat for microbiotic organisms and plants that can biodegrade some toxic chemicals and pesticides, while floodplain vegetation and natural river channels regulate in-stream temperatures to maintain an adequate environment for fish and other river life. Floodplains also provide protective refuge areas for fish during floods.

Floodplain vegetation and soils act as water filters, intercepting surface water runoff before it reaches lakes, streams, or rivers. This process aids in the removal of excess nutrients, pollutants and sediments from the water and helps reduce the need for costly cleanups and sediment

removal. Floodplains also reduce downstream flooding by increasing upstream storage in wetlands, sloughs, back channels, side channels and former channels (Wharton et al., 1982).

Floodplain Swamps

Floodplain swamps are generally characterized as permanently or semipermanently flooded and occupied by species tolerant to wet conditions, including pond cypress (*Taxodium ascendens*), bald cypress (*Taxodium distichum*), blackgum (*Nyssa biflora*), water tupelo (*Nyssa Aquatica*), Carolina ash (*Fraxinus caroliniana*), and rare plants such as West Florida cowlily (*Nuphar lutea*), spoon-leaved sundew (*Drosera intermedia*), Thorne's buckthorn (*Sideroxylon thornei*), serviceberry holly (*Ilex amelanchier*), and hairy-peduncled beakrush (*Rhynchospora crinipes*). Turkey Hen Creek has the largest population of hairy-peduncled beakrush in the Florida Panhandle (Litt et al., 2000).

Floodplain Forest

The floodplain forest community only experiences growing season floodings and is composed of species less tolerant to wet conditions including Atlantic white cedar, pond cypress, bald cypress, and red maple (*Acer rubrum*) and rare plants such as Panhandle lily, sweet pitcher plant, white-topped pitcher plant, spoon-leaved sundew, orange azalea (*Rhododendron austrinum*), Florida anise, narrow-leaved beakrush (*Rhynchospora stenophylla*), and Thorne's buckthorn. The large open gaps in the canopy results in a diverse understory of plants. Wildlife species that frequent these habitats include the Florida black bear (*Ursus americanus floridanus*) and eastern indigo snake (Litt et al., 2000).

Bottomland Hardwoods

Bottomland hardwoods on the reservation typically have saturated soils but are infrequently inundated by floodwaters. Typical species include white oak (*Quercus alba*), American beech (*Fagus grandifolia*), southern magnolia (*Magnolia grandiflora*), and rare plants such as heartleaf (*Hexastylis arifolia*), yellow-root (*Xanthorhiza simplicissima*), Florida anise, mountain laurel (*Kalmia latifolia*), and orange azalea. Wildlife species that frequent these forests include Florida black bear, eastern indigo snake, osprey (*Pandion haliaetus*), and four-toed salamander (*Hemidactylum scutatum*). Black bears heavily use bottomland hardwoods for foraging. The evergreen tree canopy is relatively dense and groundcover dominated by leaf litter and sphagnum moss (Litt et al., 2000).

APPENDIX D
SENSITIVE WILDLIFE

SENSITIVE WILDLIFE

Wildlife Habitats

Habitats are the physical and biological environmental in which organisms function and interact with other organisms. Some species use habitats uniformly, whereas other migratory species use a variety of habitats seasonally. Species welfare is dependent on the condition of essential habitat parameters. In order for an organism to utilize a habitat, it must fall with the range of conditions the organism can tolerate (Reid, 1993). Species exhibit variability in their capacity to adapt to alterations in the provision of habitat requirements.

In many cases, the viability of sensitive species populations is dependent on the provision of specific habitat variables. As an example, the ivory-billed woodpecker (*Campephilus principalis*) that once flourished in bottomland hardwood habitats of the Mississippi Embayment of the southeastern United States is now thought to be extinct. The species had habitat specific home range and food requirement; each breeding pair had a home range of at least 16 km² and its primary food source was wood-boring beetle larvae and other insects found in the bark of dead and dying trees in old-growth hardwoods. In some areas, greater than 80 percent of bottomland habitats were cleared for row crop farming. Unable to adapt to habitat alterations, the species became extinct.

Species are a product of **habitat** because there is nothing that can be done to a species to increase natality and stabilize populations. Organism habitation of ecosystems is partly dependent on the provision of a range of conditions within the tolerance of the organism. Quality habitat has adequate amounts of the physical essentials food, cover, and water for all seasons, sexes, and ages. The more types of these essentials, the greater likelihood of providing something that is a limiting factor. A limiting factor is the requirement that is present in amounts insufficient to allow for maximum species population. The provision of these essentials, which is generally governed by plant succession, is the basis of species ecosystem habitation.

Plant succession is a change in dominant plant species caused by natural or human-induced disturbances. In pioneer stages of succession (early plant growth after a clearcut) high percentages of materials are passed through the food chain in the living state, whereas in climax stages (maturing forest dominated by a few tree species) 90 percent of the energy is passed through the system by decomposers in the dead state because there is a low level of plant diversity. Species are intimately linked with a certain stage of plant succession. For animal populations to persist, the overall successional stage must remain the same. Alterations of habitat will cause changes in animal population densities and stage of plant succession. For example, quail are adapted to pioneer stages of succession, whereas white-tailed deer are best adapted to a midsuccessional stage of succession.

An indicator of quality habitat or habitat that is limiting is the degree or frequency of animal home ranges. As an example, deer with a small home range is a good indicator of quality habitat. An area where several deer home ranges intersect identifies the potential location of a land capability-limiting factor for which deer are competing. Land capability refers to the physical components of soil, water, and vegetation and the environmental factors that determine

the amount of living matter a tract of land can produce. Carrying capacity is the capability of the land to produce the maximum number of animals during the greatest period of stress each year. Habitat quality determines the land carrying capacity.

Quantity of habitat is related to the requirements of the animal species. The species most affected by wetland habitat alteration are those that require extensive amounts of contiguous wetlands or require specific plant community types. Therefore fragmentation of forest communities can restrict their use by some wildlife species. A wildlife community functioning in a healthy manner displays the following characteristics: high species diversity, diversity of functions within the community, population structure in balance with food and cover, and a complex food web.

The Eglin reservation encompasses a diversity of terrestrial, wetland, and aquatic ecosystems that support an equal diversity of plant and animal species. As previously discussed, sensitive species have habitat-specific requirements that are critical to population viability. Actions that cause disturbance could alter vegetation successional stages causing potential adverse effects on species habitat requirements, which could affect species population viability and stability.

Eastern Indigo Snake

The eastern indigo snake was granted protection by the state of Florida in 1971 and was federally listed as threatened in 1978 (Federal Register Vol. 43, No. 52:11082 – 11093). The overall range of *Drymarchon corais* extends from the southeastern United States coastal plain to northern Argentina. Only the subspecies eastern indigo (*Drymarchon corais couperi*) and Texas indigo (*Drymarchon corais erebennus*) occur within the United States.

Biology and Life Requisites

The eastern indigo snake is the largest nonvenomous snake in North America and can grow up to 125 inches in length. The snake is carnivorous and will eat any animal up to about the size of a squirrel. It frequents mesic flatwoods, hammocks, bottoms, canebrakes, thickets, and xeric areas with deep, well drained to excessively drained, sandy soils. The summer home range for a single male has been reported to be as large as 470 acres (Moler, 1985). The snake is an upper level, active, diurnal predator that often feeds along the edge of wetlands on a variety of vertebrates including fish, frogs, lizards, small turtles, and other snakes (Hallam et al., 1998).

Habitat preferences vary seasonally. Pine sandhill winter dens are used from December to April, summer territories are selected from May to July, and from August through November they are frequently located in shady creek bottoms. These seasonal changes in habitat encourage the maintenance of travel corridors that link these different habitat types (Hallam et al., 1998). Koshman (1978) listed the indigo snake as occupying seven out of eight terrestrial and five of eleven wetland habitats in Florida.

Indigo snakes are a commensal species associated with gopher tortoise (*Gopherus polyphemus*) burrows. They use burrows in winter and spring for egg laying, shedding, and protection from dehydration and temperature extremes (Hallam et al., 1998). A study of radio-instrumented

indigo snakes in Georgia found that the snakes selected Sandhills as winter habitat and 94 percent used tortoise burrows as winter dens (Landers and Buckner, 1981).

The upland LPS, creek bottoms of the unnamed stream and Crane Branch, and the bottomlands of the Yellow River floodplain provide suitable seasonal habitats for eastern indigo snakes. The existing section of RR 211 sited for obliteration is located in the transition between seasonal indigo snake habitats. Although gopher tortoise burrows were not identified during field investigations, burrows likely occur on the sandy uplands of the project area. The fire-maintained LPS of the project area provides favorable habitat conditions for gopher tortoises.

Current Status

The Florida Panhandle has a few known small populations of the eastern indigo snake, but it is generally considered rare in the region. The snake may be found in a variety of habitats on Eglin; however, sightings have been sparse (18 incidental sightings between 1974 and 1999). The closest indigo snake sighting is approximately four miles from the project site. The latest recorded sighting was a road-killed snake reported 30 January 1999 (U.S. Air Force, 2001b).

Management Emphasis

As with the RCW, threats to eastern indigo snake species viability are primarily based on the lack of suitable habitat. Population declines are primarily linked to habitat loss, fragmentation, and degradation (Moler, 1985). Additional research is needed in the area of population monitoring methods, habitat requirements of juveniles, and captive breeding and restocking potentials. Although the Eglin Natural Resources Branch has not developed an eastern indigo snake management plan, their current LPS restoration and management programs are increasing the provision of suitable snake habitats.

The primary goal is to restore LPS plant communities to a condition that best reflects natural species diversity, dominance, and distribution. The objective for achieving this goal is to manage ecosystems in a manner that directs succession toward a desired condition of scattered longleaf overstory, sparse hardwood midstory, and dense ground cover dominated by wiregrass and other native grasses and forbs.

Techniques for achieving this objective include:

- Reintroduction of frequent fires
- Natural regeneration and plantings methods
- Mechanical and chemical thinnings
- Reduction in the use of heavy impact reforestation methods
- Removal of stunted slash pine, sand pine plantations and encroaching sand pine, and replacement with longleaf pine

A high quality LPS community (Tier I) typically contains multiple age classes of pines showing a wide range of dbh classes and regeneration stages including old growth (100+ years) or older

mature (50+ years) native pine trees forming an open canopy. High quality Tier I communities exhibit portions of vegetative associations that are in or closely approximate their natural state (FNAI, 1994). A Tier I LPS community indicates a high-quality site for federally listed threatened and endangered species.

Florida Burrowing Owl

The Florida burrowing owl is a small, long-legged, brown owl that occurs on high sandy ground with little growth, particularly prairies, Sandhills, and pastures. The owls usually live in colonies and breed, nest, and brood in the burrows excavated by other animals.

The owls will often evict raccoons, snakes, and gopher tortoises to acquire desired burrows or, in some cases, they may dig their own burrows in loose sandy soils. A burrow with low, open cover that provides good horizontal visibility is preferred. Typically, a burrow will range from two to three meters long and less than one meter below the surface. The owls spend considerable portions of the day perched at the burrow entrance or atop the mound of soil surrounding it and are easily approached (Kale, 1978).

Arthropods, mainly insects, comprise the majority of the owls' diet. Small rodents and other birds are frequent prey. Nesting begins as early as November and continues to May. Factors in population decline include loss of burrow and foraging habitats and creation of suboptimal nesting habitat. It has been suggested that human activities such as mowing have had a beneficial effect on the Florida burrowing owl population (Ligon, 1963).

Florida Pine Snake

The Florida pine snake is a large (to 8.3 feet), white, tan, and black serpent. The snake is typically found in Sandhill sandy soil areas occurring primarily in longleaf pine/turkey oak forests. Male and female snake home ranges have been reported to vary from 3 to 68 acres. The snakes primarily feed on small mammals, birds and their eggs, lizards, other snakes and their eggs, and insects. The snake has a pointed snout and enlarged rostral scale that allows it to easily burrow in loosely packed sandy soils for nesting, winter hibernation, and escape. Nests are excavated in exposed, unvegetated soft-packed soil with little or no organic matter to a depth of 9 to 12 inches. Nest clearings average 166 feet long and 260 feet wide on slopes of less than 14 degrees. As with the eastern indigo snake, the pine snakes are known to use active and inactive gopher tortoise burrows. As with other sensitive species, habitat loss and degradation is a primary reason for population declines of the snake (Jordon, 1998).

Bog Frog

The Florida bog frog (*Rana okaloosae*) is a small, yellow-green frog, which makes a distinct call comprised of a series of chucks. It was first discovered in 1982 and is listed in the state as a Species of Special Concern. The entire global distribution of this species lies within Walton, Okaloosa, and Santa Rosa counties, with the only known sites found on Eglin AFB and three locations to the north of the base. The species' restricted distribution may be due to characteristics of the area's streams and soil. All known locations are small tributary streams to the Yellow, Shoal, or East Bay Rivers.

Gopher Tortoise

The gopher tortoise is found primarily within the longleaf pines of the Sandhills, as well as the sand pine scrub and live oak hammocks of the Sand Pine and Grassland/Shrubland associations (U.S. Air Force, 1995). The life of the gopher tortoise revolves around a burrow constructed by digging with its shovel-like feet. The burrows are frequently constructed in areas with low-growing plants, and sandy, well-drained soils in open, sunny areas with bare patches of ground. Gopher tortoise burrows are essential to the ecosystem of dry, sandy uplands. These burrows not only provide shelter for the gopher tortoise, but also for many other species of animals including such sensitive species as the indigo snake, pine snake, and gopher frog.

In the sandy soils of Eglin, the self-excavated gopher tortoise burrows are estimated to be between 14 to 20 feet long and 6 to 18 feet below the surface. Most burrows are straight and unbranched and have an enlarged chamber at the end. The burrows remain at fairly constant temperature and humidity throughout the year, acting as a refuge from cold, heat, and dryness. They also act as a refuge from periodic fires that occur in this dry habitat.

The tortoise primarily eats grasses, leaves, fruits, seeds, and insects. The foods most frequently found in their diets are grasses (*Poaceae* spp.) and legume fruits (*Fabaceae* spp.). Female tortoises lay 3 to 15 eggs in the sand in front of their burrows during late April and May. These eggs incubate for up to 100 days. Predators such as raccoons, coyotes, and snakes, destroy more than 80 percent of gopher tortoise nests, resulting in a very low hatching success rate (Pucket and Franz, 1991).

A 1989 report indicated 60 vertebrate and 302 invertebrate species had been recorded in gopher tortoise burrows. On Eglin, dusky gopher frogs and eastern indigo snakes use this critical habitat for cover. The gopher tortoise is found in pine and oak woodlands in the Sandhills ecological association, but can also be found in the Sand Pine and Grassland/Shrubland associations. Many inactive burrows are found on Eglin; the number of active burrows is considerably less. The rising number of inactive burrows has lead to concerns about a population decline of the species due to poaching and loss of fire-dependent habitat (U. S. Air Force, 1995).

Many associate species use or are dependent on tortoise burrows for seasonal or year-round dens, daytime retreats, nesting sites, food sources, and/or escape cover (Wilson and Mushinsky, 1997). Associate tortoise burrow species also exhibit preferences for active or inactive burrows (Lips, 1991). Although the gopher tortoise is primarily found within the longleaf pines of the Sandhills on Eglin, they also seem to have a strong affinity for open, dry, uplands of many test areas. Test area vegetation maintenance promotes the growth of preferred grass and forb food sources and high sunlight penetration, which is needed to attain minimum thermal requirements for daily activities (Mushinsky and McCoy, 1994). One tortoise may maintain two to three burrows within its home range.

Active as well as abandoned gopher tortoise burrows serve as important habitat for the eastern indigo snake. At Fort Stewart, Georgia, eastern indigo snakes were often observed at abandoned tortoise burrows (Williamson and Moulis, 1979), whereas Speake et al. (1978) found that of 108 burrow/retreat sites identified as habitat for indigo snakes, 77 percent were in active tortoise

burrows. Therefore, activities such as roller drum chopping that destroy and degrade tortoise burrow habitat can also negatively impact indigo snake populations.

Southeastern American Kestrel

The southeastern American kestrel subspecies has been extirpated over most of its former range and the current range is not described in the literature (Loftin, 1992). The former breeding range extended from Louisiana, Mississippi, central Alabama, and southern Georgia to southern Florida. Their former winter range extended from their breeding range south to the Gulf coast of Louisiana to Key West, Florida (American Ornithologists Union, 1957). There have been numerous sightings of the kestral throughout the Eglin Reservation.

The southeastern American kestrel is a small raptor that preys upon insects during the summer and also feeds on small rodents, birds, and reptiles that are common in open grasslands. More than 30 species of birds and about 30 species of mammals are listed as prey (Mueller, 1987). Generally it lays its eggs in early to mid-April (Bent, 1962). The birds search for prey from high perches along the forest edge or hover over open areas with short, sparse vegetation (DeGraff et al., 1991).

The kestrels occupy nearly all Grassland/Shrubland, Sandhills, and other forested community types. Habitat requirements include an adequate prey base, perch sites, and nesting sites. They mostly inhabit open forests and clearing edges with snags. The thick understory and midstory in Sandhills communities that are cut or are not burned may have an adverse effect on kestrel populations. Prescribed burning can be beneficial since it enhances habitat and increases the prey base (Hoffman and Collopy, 1988). The Sandhills association is a preferred habitat in Florida with the pine-oak woodlands providing quality nesting and foraging sites (Bohall-Wood and Collopy, 1986). During a nesting survey, kestrel densities were higher in Sandhill Longleaf Pine-Scrub Oak than in hardwood hammock communities (Hoffman and Collopy, 1988).

The decline in breeding pairs is correlated to a decrease in scattered, mature pine trees and snags in open habitats. Populations in north-central Florida have been reduced primarily due to logging operations. Since the 1940s, the population of southeastern American kestrels has decreased by 80 percent because of the reductions in longleaf pine flatwoods that once dominated the north-central Florida area (Smallwood and Collopy, 1993).

Nests are normally located along the forest edge and may be used for several years. The kestrels prefer to nest in snags and tight-fitting live tree cavities created by other birds (DeGraff et al., 1991). The birds most frequently locate their nests in abandoned red-cockaded woodpecker and other woodpecker holes in longleaf pines 12 to 35 feet above the ground. Natural cavities and snags in turkey oaks and live oaks may also be used as nesting sites (Hoffman and Collopy, 1987). The kestrels are quite tolerant of human activity around their nests. They are frequently flushed or caught at the nest without desertion. In Ohio, kestrels use centers of human activity more than other raptors (Fischer et al., 1984).

APPENDIX E

PUBLIC REVIEW PROCESS

PUBLIC REVIEW PROCESS

This appendix includes the public notification (Figure E-1) as it appeared in the Northwest Florida Daily News on 8 March 2003, and public comments regarding the proposed action received during the public review period.

PUBLIC NOTIFICATION

In compliance with the National Environmental Policy Act, Eglin Air Force Base announces the availability of draft Environmental Assessments (EA) and Findings of No Significant Impact (FONSI) for RCS 00-396, 02-209, and 02-245, Air Force Material Command Readiness Training Center,* for public review and comment.

The Proposed Action of RCS 00-396, 02-209, and 02-245, Air Force Material Command Readiness Training Center,* is to establish a Readiness Training Center at Eglin AFB with garrison support facilities and natural terrain training facilities. The facility would be used to train approximately 44-88 Security Forces students per 14-day period, seven times per year for a total of 300-plus students per year. The training scenarios would include assembly and convoy operations, bivouacking, patrolling, base defense operations, vehicle escort and ordinance expenditures of small arms, smoke grenades and pyrotechnics. The locations of the Training Center include 740 acres by Test Area D-51, which is north of State Road 20 in the area of Seminole and Bluewater Bay. Other facilities would be located south of SR 20, just east of White Point Road.

Your comments on this Draft Environmental Assessments (EA) and the Finding of No Significant Impacts are requested. Letters or other written or oral comments provided may be published in the Final EA. As required by law, comments will be addressed in the Final EA and made available to the public. Any personal information provided will be used only to identify your desire to make a statement during the public comment period or to fulfill requests for copies of the Final EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the Final EA. However, only the names of those individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the Final EA.

Copies of the Environmental Assessment and Finding of No Significant Impact (FONSI) may be reviewed at the Niceville Library, 206 N. Partin Dr., Niceville, Tri-Village Fire Department, 13837 Hwy. 20, Niceville, and the Fort Walton Beach Library, 185 SE Miracle Strip Pkwy, Ft. Walton Beach. Copies will be available for review from March 8 through April 6, 2003. Comments must be received by April 9, 2003 to be considered.

For more information, or to comment on these proposed actions, contact: Mr. Mike Spait, AAC/EM-PAV, 501 De Leon St., Suite 101, Eglin AFB, FL 32542-5133, or, email: spaitm@eglin.af.mil. Tel: (850) 882-2878, Fax: (850) 882-3761.

NW FL DN, 8 MAR 03 P 84

Figure E-1. Public Notification for the Proposed Action

Public Comment #1 received via electronic mail is as follows:

FROM: (ADDRESS REMOVED)
SENT: TUESDAY, MARCH 11, 2003 4:27 PM
TO: MIKE SPAITS
SUBJECT: PUBLIC COMMENTS

On RCS 02-1137 RCS 00-396, 02-209 and 02-245

THESE TESTS DO EFFECT US, AND YOU (EGLIN) KEEP ADDING MORE AND MORE TRAINING, NOISE, BOMBING, ETC. WHEN WE BOUGHT THIS HOUSE IN 1988 THERE WERE TESTS HERE BUT SINCE THEN EGLIN KEEPS ADDING AND ADDING AS IF CHACTOW BEACH WERE NOT A COMMUNITY. MOST PEOPLE IN THIS COMMUNITY DO NOT COMPLAIN BUT ALL THE TRAINING DOES EFFECT US AND OUR ENVIRONMENT. OUR HOMES ALWAYS SHAKE AND RATTLE. OUR WINDOWS BOW OUT, WE HEAR LOUD NOISES ALL DAY AND NIGHT. PLANES, GUNS, RADAR NOISES, AND LIGHTS.

**PLEASE STOP NO
ADDITIONAL TESTING---
-GIVE US A BREAK.**

(Signature removed)

Public Comment # 2 is as follows:

From: (Addressed removed)
Sent: Friday, March 28, 2003 10:08 AM
To: Spaits Mike Civ AAC/EM
Subject: training facility near BlueWater and widening of White Point.

Hello Mr. Spaits

I hope that I'm not too late to send a few comments regarding the above issues. I firmly believe that widening White Point Road would be seriously detrimental to the community in which it goes through. I would ask that Eglin choose the alternate east corridor by-pass that is recommended by the Mid Bay Bridge authority. I live very near White Point and use it on a daily basis. Automobiles on this road presently exceed the posted speed limit of 35mph by at least 10mph. If they four lane this road I understand it will increase to somewhere in the 50's. This is very dangerous for a road going right through the middle of a residential area. Also, this increase in traffic flow, and traffic speed will make the road noise emanating from it unbearable and will destroy any peace that we have in this community. To my knowledge noise barriers are not even considered or was this thought of when the widening was considered. I've spoken with several people on that issue and no one has seriously considered the noise impact. My house now is about 150feet from White Point Road now, if its widened I would be left with no choice but to put my house up for sale. Lately I've noticed many putting their house up for sale in anticipation of the road being widened. I hope that Eglin seriously considers the by pass.

The other issue that I would like to comment on is the training facility that is proposed for the same area. Some portions of this facility from what I could see would be less than 3000 feet from a residential area, as the crow flies. To my understanding from reading the newspaper that no live ordinance would be discharged, but they would have simulators that would produce the same noise effect. It would nice to be able to go home and have some peace and tranquility rather than go home and hear bombs going off near my home. Eglin is a large facility and I believe that another location could be found. Duke Field I believe would be an Ideal location for the facility proposed. It already has lodging and a large area east of the runway that is already being used for training. It would probably save the tax payer a great deal of money.

Housing in this area is at a premium because of the lack of land that is available to build houses on. House prices are skyrocketing making it hard for anyone who works at Eglin to afford a house that is near by. The only alternative is Crestview which is also saturated. I've seriously looked into to moving in anticipation of White Point being widened. What I've found is that you have to keep moving further and further north making the commute longer and longer. I simply ask that when Eglin makes the decisions they are faced with that the please consider the people in the local communities and the impact that they will have.

Sincerely,

Mr. Mike Spaits
AAC/EM-PAV
501 De Leon St., Suite 101
Eglin AFB, FL 32542-5133

PUBLIC COMMENTS ON (FONSI) FOR RCS 02-1137, RCS 00-396, 02-209 AND 02-245

Mr. Spaits,

First, I would be in disagreement of the choice of wording of the intended military actions to be performed in the immediate area and specifically the events impacting the Village of Choctaw Beach at Range D-51 and Hammock Point (Test Area D-84), or did you mean D-54? As there are Findings of No Significant Impact lets take the meaning of the words of No Significant Impact.

The word, "NO" meaning: as an adverb-used to express refusal, denial, or disagreement. When used as a Noun-a negative response; denial or refusal. Basically, the word NO when used as an adverb or noun the meanings are the same for this word.

Next lets look at the word "SIGNIFICANT" meaning: as an adjective – used when 1.having or expressing a meaning; meaningful. 2. Having or expressing a covert meaning; suggestive.

The Dictionary meanings of the two words when used together are meaningful when they relate to an Environmental Assessment. A report prepared as a negative response with denial or a refusal coupled with the operative words of having or expressing a covert meaning are revealing when anyone prepares an Impact Study. Results of the Environmental Study must be viewed as suspect by looking at the Significant Digits (as in Math) where digits of the decimal form a number beginning with the leftmost nonzero digit and extending to the right to include all digits warranted by the accuracy of measuring devices used to obtain the numbers. I can not argue that the information cited in the Environmental Assessment are incorrect only to point out that the data is correct dependent upon the accuracy of the measuring devices used to obtain the numbers and data on the date of the testing. Data collected in previous year studies some as old as the year 1995 are superseded since past and current contamination events from training and bombing on the overall Eglin Test Range have occurred. Those events are all commutative manmade additions negatively affecting the environment each having some lasting chemical residue deposited onto the land, water, and into the air.

With any explosive blast released within the environment the explosion creates conditions similar to releasing tons of TNT or other formulas without having atomic

fallout. A Conventional Bomb has a fallout area much lesser and limited but there is a defined blast area nevertheless, with resulting residue spreading throughout a region limited only by low or high-pressure weather and prevailing winds aloft. An explosion does not adhere well to prescribed limits and human expectations when variables are applied to circumstance. Contrary to a limited mindset there are no scrubbing bubbles applied like those shown in a commercial as seen on television when released will become a clean up crew of the chemical contaminants. The metals and chemicals used to make an explosive device, bomb, rocket or shell now uses spent uranium to harden the casing and the heavy metal is pulverized releasing uranium and other harmful contaminates that are introduced into the local environment. It would be virtually impossible to contain or control any or all of the airborne contaminates used in weapons production. With the blast occurring there also comes a real and lasting potential for human health problems from natural or synthetic chemicals remaining in the air until those are finally deposited onto the land or area waters of the Choctawhatchee Bay and the Gulf. Eglin Reservation is a large important watershed and recharge ground water contributor for our potable fresh water reserves. Released explosives also create debris and these materials end up in our private homes, air conditioning systems, creeks and the Bay moved along with the air currents. Such fallout areas could reach hundreds of miles depending upon the prevailing winds. In Choctaw Beach those are northwest to southeast in the winter and in summer southeast or southwest. In talking with the local EPA officials they recognize that a large amount of these friable chemicals drift towards the west or northwest towards the Yellow River and we are thinking about building a dam there? I would suggest that Choctaw Beach, Portland, and Basin Bayou also get more than a fair share of fallout from testing conducted on the ranges. I know we feel the ground blast affects as our houses shake all around us. How much fallout we get is unknown by us since there are no air sampling, water testing or bottom testing of the silt in the area waters of the creeks flowing from within the reservation. A watershed and elevation of approximately one hundred feet extending from a northerly direction with the resulting storm water emptying into Choctaw Beach Mullet Creek originating nearest the Site C-52A and Site D-51 draining into Eagle Creek from a Explosive Ordnance Disposal (EOD) Site. The Mullet Creek originating from Site C-52A drains directly into the Bay at a wayside swimming area park and children's play ground within Choctaw Beach proper. Walton County takes water samples monthly looking for bacteria only what we do not know is what other test range pollutants are present within the water and are more damaging to human health?

Chemical pollution is like having only one gray hair on our head. At first that is insufficiently alarming (NO SIGNIFICANT IMPACT), remember the meanings related above for the definitions of the separate words, refusal, denial or disagreement. However, with the passing of time and aging we wake up one day realizing we now have a full head of gray hair. Having a full-blown realization that we have a choice to dye or not to dye. Another analogy is words that rime; we can of course Dye our hair but with toxic waste, heavy metals and introduced chemicals we all slowly get sick and DIE.

We do have concerns for this is much more than the noise level that Eglin AFB monitors for the area in Choctaw Beach. Much of the complaints are about noise and blast but it is

dismissed as the sound of Freedom. I agree, but the consequences of a gradual destroying of the environment must be addressed and it surely monitored closely for we all call this area our home. Noise is a daily annoyance but noise alone will do little harm unless the decimal lcvcls exceed the safe standards of acceptable NIOSH or OSHA limits before damaging our hearing. Noise alone is only a distraction but having a storm door suddenly ripped out of your hand from a bomb concussion while attempting to open the front door is a bit unsettling. A thinking mind realizes such high explosives set upon the land brings forth other damaging consequences many times more harmful than from any noise monitoring testing effort alone.

Respectively,

APPENDIX F

AGENCY COORDINATION



Jeb Bush
Governor

Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

David B. Struhs
Secretary

April 28, 2003

Mr. Dan Nichols
Chief, Environmental Stewardship Division
501 De Leon, Suite 101
Eglin AFB, Florida 32542-5133

RE: U.S. Department of Defense - Draft Final Environmental Assessment and Draft Finding of No Significant Impacts - Air Force Materiel Command Readiness Training Center - Eglin Air Force Base, Okaloosa and Walton Counties, Florida
SAI: FL200303121150C

Dear Mr. Nichols:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated the review of the above-referenced Draft Final Environmental Assessment (EA).

The Department of Environmental Protection (DEP) indicates that the proposed activities may require permits from DEP's Northwest District for wetland impacts and stormwater management. Additional information will be needed during permit application reviews. The Air Force is advised to continue close coordination with the NW District. Please refer to DEP's enclosed comments dated April 22, 2003, for details.

The Florida Department of Transportation (DOT) offers its assistance with traffic control. The Air Force is advised to contact DOT's Public Information Director, Mr. Tommie Speights, at Post Office Box 607, Chipley, Florida 32428, (850)638-0250, or toll free at (888)638-0250 ext. 208. Mr. Speights can also be reached via e-mail at tommie.speights@dot.state.fl.us or by cell phone at (850)638-6430. Mr. Jimmey Bailey will also be available for assistance and can be contacted through email at jimmey.bailey@dot.state.fl.us (Mr. Bailey is unable to speak, but will respond by email.). Please refer to the enclosed DOT comments for contact information and further details.

Based on the information contained in the above-referenced draft EA and the comments provided by our reviewing agencies, as summarized above and enclosed, the state has determined that, at this stage, the proposed project is consistent with the Florida Coastal Management Program (FCMP). All subsequent environmental documents prepared for the project must be reviewed to determine the project's continued consistency with the FCMP. The state's consistency concurrence with the project will be based, in part, on the adequate resolution

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Printed on recycled paper.

Mr. Dan Nichols
April 28, 2003
Page Two

of issues identified during this and subsequent reviews. The state's final concurrence of the project's consistency with the FCMP will be determined during the environmental permitting stage.

The Air Force is advised that although the draft EA indicates that the proposed activities are consistent with the FCMP, the evaluation does not clearly address how the proposed project would affect the twenty-three statutes that comprise the FCMP and contains some inaccurate information about the FCMP. The enforceable policies included in the FCMP statutes cover considerably more than the issues listed in the EA. In addition, responsibility for administration of the FCMP was transferred from the Department of Community Affairs to the Department of Environmental Protection in 2002. Future projects should include a Coastal Zone Management Act federal consistency determination that addresses the project's compliance with the applicable enforceable policies included in all FCMP statutes. If a particular FCMP statute is not applicable to the proposed project, that should be stated as well.

The state agrees that the draft EA provides sufficient information for the state to evaluate the project's consistency with the FCMP at this stage of project development. The documents provided do not, however, fully address the requirements of the CZMA and 15 CFR 930, Subpart C. Future documents prepared for the project and/or other proposed federal activities should comply with the CZMA and 15 CFR 930.39 (copy enclosed). The Air Force may wish to contact the DEP's Office of Intergovernmental Programs, at (850) 245-2161, for assistance with the federal consistency determination requirement, if needed.

Thank you for the opportunity to review the project. Should you have any questions regarding this letter, please contact Ms. Rosalyn Kilcollins at (850) 245-2163.

Sincerely,



Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/rk

Enclosures

cc: Jimmey Bailey, DOT
Dick Fancher, DEP, Northwest District

Memorandum

**Florida Department of
Environmental Protection**

TO: Florida State Clearinghouse
PS
FROM: Rosalyn Kilcollins, Environmental Specialist
Office of Intergovernmental Programs
DATE: April 22, 2003
SAI: FL200303121150C - U.S. Air Force - Draft Final Environmental Assessment -
Air Force Materiel Command Readiness Training Center - Eglin AFB -
Okaloosa and Walton Counties

The Department of Environmental Protection (Department) has reviewed the above-referenced Environmental Assessment (EA) and offers the following comments:

The proposed military operation over urban terrain (MOUT) Village, Garrison facility, mock clay airstrip and road projects will require stormwater management permits from the Department's Northwest District Office in Pensacola. Permits will also be required for wetland impacts. The District notes that additional information will be required during the permit application review, including drawings that identify the location of wetland areas, stream crossings, and culverts; proposed impacts to wetlands from road structures; amount and location of off-road parking; plans for mitigation; and plans for removal of unexploded ordinance (UXO) in wetland areas. The Air Force is advised to continue close coordination with the NW District. For assistance regarding stormwater requirements, the applicant should contact Mr. Cliff Street, Stormwater Manager, at (850) 595-8300 ext. 1135. The contact for wetland permitting is Kathleen Jones, (850) 595-8300, ext. 1131.

Section 1.2.2 of the EA lists issues considered but excluded from further analysis. This section contains some inaccurate information about the Florida Coastal Management Program (FCMP). Specifically, it states incorrectly that (1) only a portion of the project area is located within the FCMP coastal zone management area; (2) issues typically evaluated for FCMP compliance, such as septic tank placement, nonpoint source pollution, construction within flood zones and consistency with community coastal development plans are not an issue with the proposed actions; and (3) that the Department of Community Affairs (DCA) is responsible for administering the FCMP. For direct federal actions, the entire state is within the coastal zone and subject to FCMP consistency review. The enforceable policies included in the FCMP include twenty-three (23) statutes, which cover considerably more than the above-listed issues. In addition, responsibility for administration of the FCMP was transferred to the Department of Environmental Protection in 2002.

Memorandum
SAI# FL200303121150C
April 22, 2003
Page Two

The referenced draft EA provides sufficient information for the Department to evaluate the project, and the Department has not identified any proposed activities that are inconsistent with its FCMP statutory responsibilities at this stage of project development. The evaluation does not, however, clearly address how the proposed project would affect the twenty-three (23) statutes that comprise the FCMP. Proposed federal projects should include a Coastal Zone Management Act federal consistency determination that addresses the project's compliance with the statutes. If a particular FCMP statute is not applicable to the proposed project, that should be stated as well. The Air Force is advised to contact the Department's Office of Intergovernmental Programs, at (850) 245-2161, for assistance with the federal consistency determination requirement, if needed.

We appreciate the opportunity to comment on the proposed project. Please feel free to call me at (850) 245-2161, if you have any questions or need additional information.

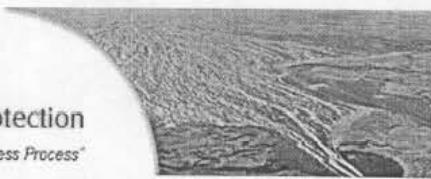
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Florida Clearinghouse



Florida
Department of Environmental Protection

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Categories

DEP Home | Contact DEP | Search | DEP Site Map

Project Information

Project:	FL200303121150C
Due Date:	APRIL 11, 2003
Description:	DEPARTMENT OF THE AIR FORCE - DRAFT ENVIRONMENTAL ASSESSMENT (EA) "AIR FORCE MATERIAL COMMAND READINESS TRAINING CENTER" - EGLIN AIR FORCE BASE - WALTON COUNTY - FLORIDA.
Keywords:	USAF-EA-EGLIN AIR FORCE BASE TRAINING CENTER-WALTON CO.
Program:	12.200
Agency Comments:	
WALTON -	
No Final Comments Received	
WEST FLORIDA RPC - WEST FLORIDA REGIONAL PLANNING COUNCIL	
No Comments/Generally consistent with the West Florida Strategic Regional Policy Plan.	
ENVIRONMENTAL POLICY UNIT - OFFICE OF POLICY AND BUDGET, ENVIRONMENTAL POLICY UNIT	
No Final Comments Received	
OTTED - OFFICE OF TOURISM, TRADE AND ECONOMIC DEVELOPMENT	
NO COMMENT.	
COMMUNITY AFFAIRS - FLORIDA DEPARTMENT OF COMMUNITY AFFAIRS	
no comments	
FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION	
No Final Comments Received	
STATE - FLORIDA DEPARTMENT OF STATE	
nc	
TRANSPORTATION - FLORIDA DEPARTMENT OF TRANSPORTATION	
For assistance with traffic control please contact Mr. Tommis Speights, Public Information Director, at P O Box 607 Chipley, FL 32428 or at (850)638-0250 or toll free at (888)638-0250 ext. 208. Mr. Speights can also be reached via e-mail at tommie.speights@dot.state.fl.us or by cell phone at (850)638-6430. Mr. Jimmey Bailey will also be available for assistance and can be contacted thru e-mail at jimmey.bailey@dot.state.fl.us (Mr. Bailey is unable to speak, but will respond by e-mail.)	
ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION	
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NORTHWEST FLORIDA WMD - NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT	
NC	

Reviewer: ROSALYNK

Date:

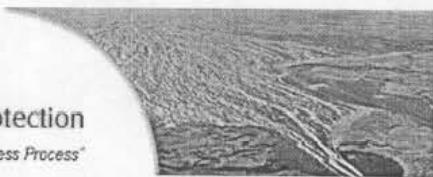
http://tlhora6.dep.state.fl.us/clearinghouse/agency/add_comments.asp?comment_id=88725... 4/28/2003

Florida Clearinghouse



Florida
Department of Environmental Protection

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Project Information

Project: FL200303121150C

Due Date: APRIL 11, 2003

Description: DEPARTMENT OF THE AIR FORCE - DRAFT ENVIRONMENTAL ASSESSMENT (EA) "AIR FORCE MATERIAL COMMAND READINESS TRAINING CENTER" - EGLIN AIR FORCE BASE - WALTON COUNTY - FLORIDA.

Keywords: USAF-EA-EGLIN AIR FORCE BASE TRAINING CENTER-WALTON CO.

Program: 12.200

Agency Comments:

WALTON -

No Final Comments Received

WEST FLORIDA RPC - WEST FLORIDA REGIONAL PLANNING COUNCIL

No Comments/Generally consistent with the West Florida Strategic Regional Policy Plan.

ENVIRONMENTAL POLICY UNIT - OFFICE OF POLICY AND BUDGET, ENVIRONMENTAL POLICY UNIT

No Final Comments Received

OTTED - OFFICE OF TOURISM, TRADE AND ECONOMIC DEVELOPMENT

NO COMMENT.

COMMUNITY AFFAIRS - FLORIDA DEPARTMENT OF COMMUNITY AFFAIRS

no comments

FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

No Final Comments Received

STATE - FLORIDA DEPARTMENT OF STATE

nc

TRANSPORTATION - FLORIDA DEPARTMENT OF TRANSPORTATION

For assistance with traffic control please contact Mr. Tommis Speights, Public Information Director, at P O Box 607 Chipley, FL 32428 or at (850)638-0250 or toll free at (888)638-0250 ext. 208. Mr. Speights can also be reached via e-mail at tommie.speights@dot.state.fl.us or by cell phone at (850)638-6430. Mr. Jimmey Bailey will also be available for assistance and can be contacted thru e-mail at jimmey.bailey@dot.state.fl.us (Mr. Bailey is unable to speak, but will respond by e-mail.)

ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

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NORTHWEST FLORIDA WMD - NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT

NC

Reviewer: ROSALYNK

Date:

http://tlhora6.dep.state.fl.us/clearinghouse/agency/add_comments.asp?comment_id=88725... 4/28/2003

Page 6 of 11

COUNTY: WALTON

DATE: 3/12/2003
 COMMENTS DUE DATE: 4/11/2003
 CLEARANCE DUE DATE: 5/11/2003
 SAI#: FL200303121150C

MESSAGE:

STATE AGENCIES	WATER MNGMT. DISTRICTS	OPB POLICY UNIT	RPCS & LOC GOVS
COMMUNITY AFFAIRS	X NORTHWEST FLORIDA WMD	ENVIRONMENTAL POLICY UNIT	
ENVIRONMENTAL PROTECTION			
FISH and WILDLIFE COMMISSION			
OTTED			
STATE			
TRANSPORTATION			

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

- Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.
- X Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.
- Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.
- Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

DEPARTMENT OF THE AIR FORCE - ENVIRONMENTAL ASSESSMENT (EA) "AIR FORCE MATERIAL COMMAND READINESS TRAINING CENTER" EGLIN AIR FORCE BASE - WALTON COUNTY - FLORIDA.

To: Florida State Clearinghouse

AGENCY CONTACT AND COORDINATOR (SCH)
 3900 COMMONWEALTH BOULEVARD MS-47
 TALLAHASSEE, FLORIDA 32399-3000
 TELEPHONE: (850) 245-2161
 FAX: (850) 245-2190

EO. 12372/NEPA Federal Consistency

No Comment No Comment/Consistent
 Comment Attached Consistent/Comments Attached
 Not Applicable Inconsistent/Comments Attached
 Not Applicable Not Applicable

NO COMMENTS

From:

Division/Bureau: _____ NWFWM
 Resource Management Div.
 Reviewer: _____ Duncan J. Cairns
 Date: 1 APR 03
 Date: _____

Page 8 of 11

COUNTY: WALTON
 SAI- USAF-EA
 2003- 2252

DATE: 3/12/2003
 COMMENTS DUE DATE: 4/11/2003
 CLEARANCE DUE DATE: 5/11/2003
 SAI#: FL200303121150C

MESSAGE:

STATE AGENCIES	WATER MNGMT. DISTRICTS	OPB POLICY UNIT	RPCS & LOC GOVS
COMMUNITY AFFAIRS	NORTHWEST FLORIDA WMD	ENVIRONMENTAL POLICY UNIT	
ENVIRONMENTAL PROTECTION			
FISH and WILDLIFE COMMISSION			
OTTED			
X STATE			
TRANSPORTATION			

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Project Description:

DEPARTMENT OF THE AIR FORCE - ENVIRONMENTAL ASSESSMENT (EA) "AIR FORCE MATERIAL COMMAND READINESS TRAINING CENTER" EGLIN AIR FORCE BASE - WALTON COUNTY - FLORIDA.

To: Florida State Clearinghouse

EO. 12372/NEPA Federal Consistency

AGENCY CONTACT AND COORDINATOR (SCH)
 3900 COMMONWEALTH BOULEVARD MS-47
 TALLAHASSEE, FLORIDA 32399-3000
 TELEPHONE: (850) 245-2161
 FAX: (850) 245-2190

No Comment No Comment/Consistent
 Comment Attached Consistent/Comments Attached
 Not Applicable Inconsistent/Comments Attached
 Not Applicable

From: Division of Historical Resources
 Division/Bureau: Bureau of Historic Preservation

RECEIVED
 APR 14 2003
 OIP/OLGA

Reviewer: S. Edwards
 Date: 4/9/03

Judith P. Coyle
 Deputy SHPO
 4/9/03

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Page 2 of 11

COUNTY: WALTON

DATE: 3/12/2003
 COMMENTS DUE DATE: 4/11/2003
 CLEARANCE DUE DATE: 5/11/2003
 SAI#: FL200303121150C

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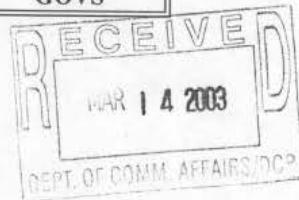
MESSAGE:

STATE AGENCIES
X COMMUNITY AFFAIRS
ENVIRONMENTAL PROTECTION
FISH and WILDLIFE COMMISSION
OTTED
STATE
TRANSPORTATION

WATER MNGMT. DISTRICTS
NORTHWEST FLORIDA WMD

OPB POLICY UNIT
ENVIRONMENTAL POLICY UNIT

RPCS & LOC GOVS



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Project Description:

DEPARTMENT OF THE AIR FORCE - ENVIRONMENTAL ASSESSMENT (EA) "AIR FORCE MATERIAL COMMAND READINESS TRAINING CENTER" EGLIN AIR FORCE BASE - WALTON COUNTY - FLORIDA.

RECEIVED
MAR 19 2003
OIP/OLGA

To: Florida State Clearinghouse

EO. 12372/NEPA Federal Consistency

AGENCY CONTACT AND COORDINATOR (SCH)
 3900 COMMONWEALTH BOULEVARD MS-47
 TALLAHASSEE, FLORIDA 32399-3000
 TELEPHONE: (850) 245-2161
 FAX: (850) 245-2190

No Comment No Comment/Consistent
 Comment Attached Consistent/Comments Attached
 Not Applicable Inconsistent/Comments Attached
 Not Applicable Not Applicable

From:

Division/Bureau:

Reviewer:

Date:

DCA/DCP
3/17/03

APR. 01 2003 10:56

#5110 P.001/002



WEST FLORIDA REGIONAL PLANNING COUNCIL
 Post Office Box 9759 • 3435 North 12th Avenue • Pensacola, Florida 32513-9759
 Phone (850) 595-8910 • S/C 695-8910 • (800) 226-8914 • Fax (850) 595-8967

Lel Czeck
 Executive Director

Cody Taylor
 Chairman

Sydney Joel Pate
 Vice-Chairman

FAX TRANSMITTAL (S) **Total # of Pages (including cover): 2**

TO: **STATE CLEARINGHOUSE • FAX: (850) 245-2190/(850) 245-2189**
 Phone: 850-245-2161

DATE: April 1, 2003

FROM: *JNL*
 Jerrie Nelson Lewis, Intergovernmental Review Coordinator
 Extension 226
 lewisj@wfrpc.dst.fl.us

SUBJECT: State Clearinghouse Review(s) Fax Transmittals:

SAI #	Project Description	RPC #
FL200303191296C	Dept. of Housing and Urban Development – Community Development Block Grants – Amendment to Escambia consolidated plan, commercial façade and rehabilitation program – City of Pensacola, Escambia County, Florida.	E-1047-03-21-03
FL200301313377C	U.S. Dept. of Housing and Urban Development – Community Development Block Grant – Continuation of multi-year project addressing the housing needs of low-income families – 3 sites – City of Pensacola, Escambia County, Florida.	E1048-03-24-03
FL2003303121150C	Department of the Air Force – Environmental Assessment (EA) “Air Force Material command Readiness Training Center” Eglin Air Force Base – Walton County – Florida.	W167-03-24-03

<input checked="" type="checkbox"/>	No Comments – Generally consistent with the WFSRPP
	Comments Attached

“...Serving Escambia, Santa Rosa, Okaloosa, Walton, Bay, Holmes & Washington Counties and their municipalities...”